The Builder.

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Taste in the Household.

NOTWITHSTANDING all that has been said and done to improve the public taste, much more must be written and told, retold and reiterated, before those working in any department of this reformation may dream of ceasing from their labours. One book, one lecture or series of lectures, one exhibition devised for the purpose of elevating public taste, in the matter of articles of household furniture, for example, is but as the oft-mentioned drop in the ocean. It is the untiring repetition of a text that calls attention to it and causes it to strike the imagination, dwell in the heart, or fasten upon the memory. We must have piles of books, scores of lectures, repeated exhibitions of worthy art-work, before we can expect to see an appreciable difference in the taste of the great bulk of our fellow-subjects. It is now upwards of thirty years since Pugin first brought before the public, in a practical form, the possibility of making the interiors of our homes as picturesque as the ancient mansions of our forefathers, without detracting from their comfort, by attention to beauty of form in domestic furniture. He not only pointed out what we should aim at having and the principles that should lead us to the selection he recommended, but he showed what should be avoided. In our own columns, through the intervening years, the subject has been treated over and over again. Then we must not forget the chamber of horrors at Marlborough House, before it was a royal residence, where articles of bad taste were gathered together and exposed to scorn; nor the continuity of instruction in truer taste provided, by the same teachers, at the South Kensington Museum. The praiseworthy dictionary of M. Viollet-le-Duc, copiously illustrating the domestic furniture of the thirteenth, fourteenth, and fifteenth centuries, from a foot-stool to a canopied seat, a cradle to a state-bed, a *dressoir* to the jewelled and enamelled *drageoirs* displayed upon it, and so on through every apartment in a French château, with like comprehensiveness, proved another notable accession to our stores of information and instruction. But all these must be looked upon as only initiatory steps in the grand march of progress. They form but a faint trackway, through a region beset with monstrosities. This trackway has yet to be beaten into a fair, broad path; and the monstrosities have to be driven into the background, if not into a bonfire.

It is then with a conviction that, although much has been said of the nonsense, vulgarity, and want of thought displayed in the matter of household furniture by the public, and the desirability of fostering an appreciation of beauty combined with fitness, it is not too late to say a great deal more, that we turn over the pages of a work on "Household Taste," by Mr. Eastlake.* His treatment of the subject differs from that of some previous writers in this particular: instead of contenting himself with ancient examples, or selections of these contrasted with modern mistakes, he aims rather at pointing out from the actual stocks of leading firms in different branches of the furnishing trades, such materials, designs, and objects as are not flagrant violations of good taste. This has the drawback of conferring upon his work somewhat of the character of a trade circular; but it is advantageous so far as it brings the practicability of procuring inoffensive articles before the reader's eyes. One closes M. Viollet-le-Duc's fascinating pages with a sigh of regret that all poetry, beauty, and artistic feeling have departed from our houses for ever, for the exquisite objects he delineates as being household realities in former times are no longer to be bought for love or money. But if Mr. Eastlake's volume falls short of awakening such an ecstacy of admiration, it has a homely usefulness in directing attention to reforms that can be carried out, and purchases that can be made, any day in the week, that would invest homes with somewhat of the old interest and comeliness. We will not, however, unreservedly endorse all his suggestions. For instance, he would do away with castors to tables. He says, "Such an appliance is by no means necessary or desirable. A dining-table rarely requires to be moved from its ordinary position. It should stand firmly on its legs at each corner. When it is fitted with castors, servants are perpetually pushing it awry." Now, round the legs of a table without castors in everyday use there would inevitably come to be a halo of dirt, because no sweeping or scouring brush in the hand of a housemaid would be able to thoroughly cleanse the floor close up to each leg. Again, when a change in the position of the table was required for any special purpose, if there were no stout serving-men at hand to lift it, the carpets would get dragged and torn by its being shuffled about. In some minor matters of this kind we disagree with Mr. Eastlake.

After a preliminary chapter on street architecture, illustrated by a street in Nuremberg, more *churriqueresque* than picturesque, our author begins a tour through the principal apartments of a modern house at the entrance-hall. Here he recommends the use of staining fluid for the woodwork instead of paint. But if the latter must be used because it has been already applied, then he prefers a flat tint of dark green or chocolate, instead of graining in imitation of oak. He regrets the disappearance of the old-fashioned brass knocker, whose bright spotliness gave such an air of industrious cleanliness to the threshold of a house; and considers its present cast-iron substitute a "frightful invention." Three illustrations of wrought-iron knockers, two antique and one modern, kept in stock by a well-known metal-worker, show how we can best meet this requirement. Door-mats and rugs are not overlooked, and our author fails not to deprecate the use of those "silly lumps of blue, or mauve-stained wool, called drawing-room door-rugs;" also made in white, and which are out of all correspondence with their purpose. He gives, too, a series of patterns of encaustic tiles and tiled borders out of a trade catalogue suitable for the floor, and suggests what should be done with the walls. He approves either a sort of dado of encaustic tiles, 3 ft. or 4 ft. high, with the wall painted, or the plaster washed with flatted colour above, or distemper painting. For colours, where there is but little light, he suggests pale green or drab; and the Pompeian and Egyptian red for halls that are well lighted. He gives a design for a hall table, which differs from those in present use by the addition of a raised dorsal furnished with a narrow shelf. For hall chairs he makes no recommendation, but gives a sketch of one at Cotehele, a Tudor Cornish mansion, as an illustration of what they used to be before the present decadence of taste set in.

In the dining-room there is not only more to find fault with, but more to commend in modern manufactures, in our author's estimation. Beginning with the table, he says:—"It is generally made of planks of polished oak or mahogany laid upon an insecure framework of the same material, and supported by four gouty legs, ornamented by the turner with mouldings which look like inverted cups and saucers piled upon an attic baluster." A sketch of an end of one of these graceless uninviting modern tables is supplemented with one of a handsome Jacobean make, a design in which the strength and form of the latter is combined with the telescopic capacity of the former, and two illustrations of old German tables. With reference to the sideboard, he urges, as we have often urged, the reinstatement in the dining-room of the ancient *dressoir*, now only known in the kitchen as the dresser. The modern sideboard is but the *torso* of this noble piece of furniture. We have, indeed, the wide board, useful in the service of the dinner; but where are the shelves upon which treasures in ceramic ware and metal-work can be suitably displayed? Mr. Eastlake gives a design for a sideboard based upon the ancient form, not quite so graceful as some of the old models, but still a great improvement upon the present dwarfed fashion. For dining-room chairs he gives examples from Earl de la Warr's seat at Knowle, belonging to Stuart times; and from modern manufacturers' stocks selects those known as the Cromwell chairs as the least objectionable. Following others he inveighs against the modern upholsterer's method of hanging window curtains. But he goes further. We must admit he is a brave man; for time after time he attacks the taste of the ladies—we must add, the young ladies particularly; and in this apartment he takes them to task about their "lace trimmings and edgings used for 'antimacassors,' and similar articles of household use." After exhorting them all to inspect the specimens of ancient lace in the South Kensington Museum to improve their taste in designs for this class of work, he saves his credit by gallantly making an exception in favour of the productions of one fair lady—sly Mr. Eastlake!—and gives an illustration of her hand-made lace, the design of which he contends is "exactly in accordance with the spirit of old and sound principles of manufacture." Of stuffs for window-curtains he enumerates several kinds:—

"In the early part of this century window-curtains were only made of silk or damask. The material known as 'rep' was next introduced, and was in many respects superior to what had been used before. But the Germans have invented a still better stuff, a mixture of silk, wool, and cotton, called *cotelas* in the shops, which is often worked in disper patterns of excellent design. It is one of the most artistic examples of modern textile fabric which I know. To the French we are indebted for a heavy ribbed material, decorated with broad bands or stripes of colour running transversely to its length, and resembling the pattern of a Roman scarf. This stuff has been much in vogue of late years, particularly among artists and people of good independent taste.

Another French material called 'algerine' appeared for a short while in the London shops. It was made chiefly of cotton, and was also designed with horizontal stripes of colour on an unbleached white ground. In effect it was all that could be wished, and it had, moreover, the additional advantage of being washable; but, of course, because it was cheap and about the best thing of the kind which had appeared for many years, it found few admirers and but little demand."

* "Hints on Household Taste in Furniture, Upholstery, and other Details." By Charles L. Eastlake. London: Longmans, Green, & Co. 1868.

This is not quite complete; for, besides the silk and damask, there was a stout stiff woollen material, called "moreen," in very general use from forty to twenty years ago. We know artists are subject to strange enthusiasms, else how could we account for an incongruous mixture of alternate strips of velvet and common horse-girths for curtains, mentioned by our author as the device of artistically-trained minds? We must pass on, however. Before entering the library, the writer lingers to make a chapterful of observations on floors and walls. In the matter of carpets he altogether parts company with English manufacturers. He prefers the "humblest type of Turkey carpet or cheapest hearth-rug from Scinde," to anything they can show. Their wreaths of roses, their malachite marble patterns, their crimson moire antique, with borders of vine-leaves, he consigns to Madame Tussaud's extra-sensational chamber; but when he touches upon paperhangings, he makes them some amends. These mural decorations have been as execrably bad as English carpets could possibly have been at their worst; but there are now exceptions to be found that should infuse courage into the carpet trade. Although, from the improvements in this manufacture, it would appear not to be so much a matter of necessity, our author gives a series of patterns for wall-papers, modified by himself, from diapers shown by some of the old Italian masters.

In modern library furniture there is less to find fault with than in that of other apartments. Contrary to the dictates of the principle that requires that everything should appear to be what it really is, Mr. Eastlake suggests the staining of unpolished mahogany with black for book-shelves. This imitation ebony, he says, looks well when covered with a thin varnish and contrasted with white metal for hinges and escutcheons. He gives a design for a bookcase in which the most novel feature is a sloping roof instead of the usual flat top finished with a cornice. For access to the space in this new top he has devised a trap-door in the centre of it, which has a miniature gablet projecting from it. This sloping top is introduced also in a design for a cabinet. But for the super-imposed pigeon-hole it would have the merit of not harbouring dust. A second utilization of space is more effective. This is the addition of upper shelves to the ordinary single shelf over the fireplace. When there is no *dressoir* in the dining-room, the library becomes the best place in which to place any specimens of art-manufacture that are worth looking at. "Few men care for a mirror in such a room; but if it is indispensable to the mantelpiece, let it be a long low strip of glass, stretching across the width of the chimney breast, about 18 in. in height, and divided into panels. Over this may be raised a capital set of narrow shelves,—say 6 in. wide and 12 in. apart,—for specimens of old china, &c. The plates should be placed upright on their edges, and may be easily prevented from slipping off by a shallow groove sunk in the thickness of each shelf. A little museum may thus be formed, and remain a source of lasting pleasure to its possessors, seeing that 'a thing of beauty is a joy for ever.' In his own sketch of this arrangement he shows but two shelves over the usual mantel-shelf, the lower one decked with tall handsome vases, and the upper one with circular dishes. The effect is good. He properly bestows upon the work of the smith as much care as upon that of the cabinetmaker. The miserable designs of the cast-iron ornaments, set like brands of paltryness upon modern stoves and fenders, deserve all the blame they receive at his hands. A fender should be a *fender*, a protector, and to this end he recommends a form for it that should fulfil that condition. A library fender shown consists of four rods following the contour of three sides of an octagon, supported, at even distances apart, by four uprights, up to about half-way the height of the opening of the fireplace, the space between the two lowermost being filled in with sheet iron or brass, perforated with a sightly pattern. The library fender curiously suggests the breakfast urn, upon which our author falls with all the severity it deserves, as "the most contemptible instance of perverted taste" known to him; and, with more connected sequence, modern gasaliers and moderator lamps. Some examples of ancient German and Swiss metal-work, supplemented by drawings of samples of the modern candlesticks and vases kept in stock by leading firms close the inspection of the library.

The young ladies and the upholsterers are both rated soundly by Mr. Eastlake when he uncovers the shortcomings of taste in the drawing-room. It is to be hoped they will be improved by his Spartan austerities. He seems to think, if it were not for the young ladies' preference for the attributes of millinery in the aspect of everything, however unsuitable for that frail description of feminine decoration, the upholsterers would cease to manufacture the absurdities they now launch upon society; and if it were not that the latter debased the young ladies' taste by the tempting exhibition of such frivolities, they would know better. Especially, if upholsterers were to wean themselves from the production of meaningless curves at every turn they would be wiser men. On this subject he remarks,—

"The tendency of the present age of upholstery is to run into curves. Chairs are invariably curved in such a manner as to ensure the greatest amount of ugliness with the least possible comfort. The backs of sideboards are curved in the most senseless and extravagant manner; the legs of cabinets are curved, and become in consequence constructively weak; drawing-room tables are curved in every direction—perpendicularly and horizontally—and are, therefore, inconvenient to sit at, and always rickety. In marble washstands the useful shelf, which should run the whole length of the rear, is frequently omitted in order to ensure a curve. This detestable system of ornamentation is called 'shaping.' It always involves additional expense in manufacture, and therefore, by avoiding 'shaped' articles of furniture, the public will not only gain in an artistic point of view, but save their pockets."

Influenced by these sentiments, there are no bandy-legged drawing-room chairs either in our author's sketches from ancient examples or in his own designs. He gives a settee, a sofa, a chair, and an arm-chair of the date of 1620, from a set preserved at Knowle, which are interesting. As an improvement upon the modern round table resting on its hollow cylinder and three claws, he suggests that the central stem should be made solid and have a substantial base, and that four struts should stretch diagonally from the stem to support the table-top. For chairs, tables, and couches he prefers marquetry to carving, which he would leave for cabinets, coffers, and sideboards, where hard projections are not likely to be so much in the way. The garish looking-glass frame of the present day he would have banished to give place for real carved work, or, as a substitute for this, plain solid frames of wood, either enriched with suitable mouldings or incised ornament. Common woods ebonised, and set off with narrow gold stripes, form another alternative. For pictures he recommends classification. Thus the dining-room should enjoy the undisputed possession of family portraits; while in the drawing-room should be placed more miscellaneous works. Oil and water colours should not be contrasted with one another, nor placed in juxtaposition with engravings and photographs. One row only should be placed in a room, and that should be hung at a height of 5 ft. 6 in., measuring from the floor to the centre of the picture. This arrangement he says happily, would make a sort of coloured zone round the room, especially pleasing if varied by the introduction of small ornamental mirrors, sconces, brackets supporting statuettes, vases, &c. No picture should be suspended by less than two nails at the triangles outlined by the cord; when one only is used it is always at variance with the horizontal and vertical lines of a room.

But if our author is unhappy in the drawing-room, he has, and finds, good reason for being inconsolable in the bedroom. The gaudy chintzes, the flaunting wall-papers, the bewildering carpets, the unblushing French-polish, the distorted landscapes depicted on the chamber-ware, would be enough to make any reformer consider the case hopeless; but when these are supplemented by a veiled dressing-table, all ribands and muslin, that looks very much like a lady dressing for a ball without her head and shoulders,—nothing but retreat seems open for the bravest. For this last-mentioned item of bad taste our author has suggested an exchange to a low straight chest of drawers, covered with a fair cloth with fringed ends; but this is not likely to be accepted by those whose delicate health, or fatigue attendant upon a fantastically got-up headgear, requires the accommodation of a chair while making this part of their toilet. A table made open under the centre, with the drawers on both sides of this space, would be preferable in most cases.

He gives a design for a wash-stand, made in accordance with his horror of curves, which is a sensible and substantial piece of furniture, suitable for its purpose. Among other matters discussed, the bed, of course, comes in for stricture. He says,—

"The design of metal bedsteads is generally very poor, especially where anything in the shape of decoration is introduced. For instance, it is usual to conceal the joint which occurs where the tie-rods intersect each other with a small boss. A circular rosette would be obviously the most appropriate feature to introduce at this joint, whether in wrought or cast metal. But instead of this, the iron-bedstead maker (*elegantiæ gratiâ*, as the grammarians say) insists on inventing a little lumpy bit of ornament, which possibly intended to represent a cluster of leaves, more closely resembles a friendly association of garden slugs, and this abomination is repeated not only a dozen times in one bedstead, but on some thousands the same pattern."

Against this he sets a design which, so far as the suspension of its canopy from the ceiling is concerned, is a modernization of an ancient French bedstead given by M. Viollet-le-Duc. The transverse stripes on the curtains, the horizontal stripes on the trim box-plaited valences round the bed, the open metal-work footboard, group together exceedingly well, and confirm the impression that a very little alteration in some of the designs of our newest commodities would bring them within the pale of propriety.

The latter portion of this volume is devoted to crockery, table-glass, dress and jewelry, and plate and cutlery. In all these matters the superiority of the labour of the art-workman's hand over the machine is advocated. If the forms of plates, dishes, and saltcellars, for instance, are less rigidly symmetrical, if the glaze is unequally distributed, if the colour is fainter on some parts than others when made by hand, there is a power of attraction in them for the educated eye that no machine-made pottery can have; for there is life in them, and man's mind and skill. Like as he prefers the Oriental carpet to the mock gardens of our manufacturers, and for the same reasons, so an Indian preserve-jar or a Moorish plate is beyond any of the spiritless and loveless productions of most of our potteries. A point of departure in the minds of the Oriental potter and the English designer is the separation of the pictorial idea from the decorative. The former conventionalises the objects he depicts on his ware for its adornment; the latter aims at the most realistic representation of a landscape, or perhaps sea-view, as though its fidelity and minuteness of detail were of the first consequence, and the general effect of the piece of ware of none whatever. Again, ancient glass is infinitely preferable to modern, because in its manufacture its natural properties were considered; whereas at the present day they are nearly forgotten in the desire to produce vessels that are accurately symmetrical, colourless, and flawless. "To the eye of the artist," says our author, "the delicate gradations of natural colour, the slight imperfections and streakiness of old glass, render it infinitely more attractive than a purity of texture, which has nothing but its clearness to recommend it, and which can only be acquired by a sacrifice of more precious qualities. For the simple transmission of light through the best piece of flint glass that could be manufactured, is of small value compared with the mellow and often jewel-like effect produced in the design of a Venetian beaker." And in accordance with the scheme of his task, he points out where glass, approximating as near as may be to the ancient perfection, can be obtained. For all such information, however, we must refer the reader to the work. We have only to show, in the present case, the mode in which our author has carried out his aim to improve the taste of the general public. The only reform in the department of costume that he ventures to advocate, is the adoption of knickerbockers, though hats, hoops, boots, and coats all come under his lash.

Mr. Eastlake is not correct in attributing the "moustache movement" to the visit of foreigners in 1851. It was commenced and carried on persistently by the *Builder*, at first specially with reference to sanitary considerations for workmen; and was continued by writers and lecturers admittedly prompted to action by our pages.

The young ladies escape censure as to dress, for the simple reason that while he writes the details of colour and form in their costumes will change so considerably, that his words will no longer apply by the time he comes to the end of his remarks. But their jewelry, being a little less evanescent than their millinery, is open to more serious criticism. Too often, he fears, it is valued more for the money it cost, or would sell for, than for its intrinsic beauty, either in material, design, or workmanship. He thinks if diamonds were cheap and common, no one would wear them.

"They would be at once and for ever banished from the necks and heads and stomachers of every court belle in Christendom." As it is, he finds fault with the way they are worn, grouped together, in some instances, in quantities sufficient to make a blaze of light, instead of being isolated like the stars above us; and the cutting and paring of them down to obtain lustre, as in the case of the Koh-i-noor, he considers of questionable propriety. But this is not worse than the taste for strings of large single diamonds, devoid of all artistic accessories. Less expensive jewelry, particularly that which is either directly copied or adapted from antique precedent, is often in better taste. But the best specimens are those of other countries and other ages. The rudely-made trinkets the Russian peasants treasure, the still more mystic-looking manufactures from Central India, as well as the ancient work of the earliest of Rhenish Byzantine artists, are all preferable to the commonplace thoughts expressed in modern English goldsmith's work. Those who would know what really good jewelry is like, must search the cases of the South Kensington Museums from time to time when ancient specimens are displayed. Coming down to plate, he misses the spirit that designed the apostle spoons of old. "Take," he cries, "the ordinary 'fiddle pattern' fork: can anything be more senseless than the way in which modifications of that form are decorated,—now with a raised moulding at its edge, now with an outline of beads, now with what is called 'a shell,' but what is really a bad copy of the Greek honeysuckle ornament, at the end of its handle, now with a Rococo scroll or a representation of *natural* flowers in low relief on its surface?" If Dame Quickly had placed one of these nonentities before her guests it would have taken the flavour out of their sack. Sweet Anne Page would have scorned such a spoon. But if the merry wives of old would have disdained our prosaic spoons and forks, with what discontent would they have regarded our tasteless tureens, side-dishes, cruet-stands, salvers, and candlesticks? Surely nothing piquant, they would argue, could come out of such fumbling, feeble 'prentice-work. For guidance, our author says, "Round silver dishes and salvers are preferable to those of an oval or square shape, for many reasons, and especially on account of the mode in which such articles are manufactured. Richly-moulded edges are, for a like reason, inappropriate; moreover, in precious metal they necessarily increase the cost, and in plated goods they are liable to be rubbed and look shabby." The loss of the old appreciation of an artist's work is remarkably noticeable in our modern cutlery. The machine only is recognised in this department of the world's industry. We are not surprised to find the richly-carved and gently-curved knife-handle of the past contrasted with the plain, smooth, small bone or ivory parallelogram of the present day, in the pages before us. Staining bone-handles is recommended as a substitute for the shagreen that once was so effective, and studding dark wooden handles with flat steel ornaments is indicated as a fashion that might be revived. Mother-of-pearl handles are preferred for dessert knives and forks, as more agreeable in touch and appearance than silver or plated goods. Whilst the silversmith's and cutler's arts remain at their present stage there would be less vexation of spirit, our author infers, if an intending purchaser make his selection from the stock of some of the old jewelry shops in Hanway-street or Wardour-street; against which last-mentioned place, by the way, as the head-quarters of sham ancient cabinet-work, the unwary are especially warned in a former part of the work. There are many metal-workers who have aimed at reviving the ancient taste and dignity of the silversmith's art, but then they charge for their goods treble the price of similar articles of the ordinary makes, and while they cannot see that a good design should not cost more than a bad one, because it need not involve more labour in execution, there is no immediate prospect of any appreciable reform in this department. If manufacturers do not assist in educating the public taste by the production of goods suited to everyday life that are designed upon true principles, the unaided influence of our museums will make but slow way. As appealing from purchaser to producer, bestirring first the one to create a demand and the other to supply it, and *vice versâ*, pitting them against each other as it were, Mr. Eastlake's work will help on the issue.

COSMOPOLITAN BRITAIN.

The Grecian colonists, who pushed adventurously across the Adriatic, and founded the cities of South-Eastern Italy, and the yet erect temples of Pæstum, gave the name of *Magna Grecia* to their new country. They were the missionaries of a civilisation which has outlived the political term of the republics of peninsular and insular Greece, as well as that of the stern iron empire which absorbed the Italian Greeks. Greek letters, and Greek science, retiring from an Eastern exile, gave a tone to the civilisation of Europe, being adopted by the students of that graver Roman law which would otherwise have yet more profoundly modified our manners and our faith. The colonising impetus, stimulated by the discovery of a new world, sent the most restless of our own race on a new mission in the Tudor times. "The development of the England of Elizabeth," we have here a traveller who tells us,* "is to be found not in the Britain of Victoria, but in half the habitable globe. If two small islands are by courtesy styled 'Great,' America, Australia, India, must form a Greater Britain."

Greater, there is no doubt, in territory and in population. And yet there is a sense in which the term may be taken, and will, perhaps, be taken too, by the enemies of England herself, which might make the author wish he had sought some other appellation for our giant offspring. Some may even think at first, as they accompany Mr. Dilke through the lands where the shadow of a terrible and relentless war is cast over his brilliant pages, that some such covert satire was intended by his title. But amid the invigorating breezes of New Zealand the shade disappears. The gloom with which he so often speaks of the inhabitants of one set of free states as "rebels" against the inhabitants of another set, is charmed away by the soft cadence of the Maori song. The second part of the first volume of "Greater Britain," containing the chapters which treat of Polynesia, we have read with unmingled pleasure. There is much in them that is novel,—much that ought to be known. The picturesque description of scenery and inhabitants enables us to glance over the traveller's shoulder, or at least to see through the clear vision of his memory. The peculiarity of the climate is reflected no less in the unusual character of the vegetation, than in the strange features of social life.

The highway of 170 miles in length, which, crossing the New Zealand Alps, connects Canterbury with Christchurch, is "corduroyed" with the trunks of the tree fern; and in the swamps these trunks have again taken root, and shot forth fronds, forming a grove that rises out of the very bones of the road. The semi-tropical vegetation grows up to the very limit of the eternal snows, and the most graceful form of all flowerless plants, the natural production of the botanical belt that immediately succeeds the equatorial growth of palms and bananas, is found on the very edge of a glacier. As to this, too, Mr. Dilke tells us that the glaciers of Mount Cook are the longest in the world, except those at the source of the Indus.

The political importance of the labours of the engineer receives ample illustration in New Zealand. The settlements in this island are historically distinct, and, in the original absence of roads, were totally separated from each other by impenetrable bush. Hence resulted the establishment of no less than ten cabinets and ten legislatures, for a population of 200,000 souls. Thus it came to pass that the taxation of the inhabitants of New Zealand is nine times as heavy as that of those of Canada.

Landing in Virginia in June, 1866, Mr. Dilke's rapid line of travel runs on through New York, across Canada, over the never-ending sweep of the Great Plain, to the Mormon State, and to the "Golden City." He steamed along the shores of Lower California to Mexico, and sailed from Panama for Wellington in New Zealand, the longest steam voyage in the world. Thus the first part of the book is entitled "America;" the second, "Polynesia." Australia forms the third portion, containing chapters on Sydney, Victoria, Tasmania, and Adelaide. The fourth part is devoted to India; Ceylon, Benares, Simla, Umritsar, Lahore, and Bombay, being the local headings of chapters. In this division of the work the chapters on overland routes, and on France in the East, will prove especially interesting to our readers.

On the former of these points, Mr. Dilke is of opinion that the Brindisi route from Alexandria, by which he returned to England, is the proper line for our Indian mails to take until the Euphrates road is made. It is more than twelve years since we became convinced of the truth of this opinion. The completion of a line of railway, running by Constantinople, bestriding the Bosphorus, and striking on the head of the Persian Gulf, would only leave the distance from Bussorah to Kurrachee to be performed by water. We cordially agree with Mr. Dilke "that the direct route to India is one of the most pressing of the questions of the day."

In the chapter "France in the East" Mr. Dilke gives less distinct information, as to the actual condition of the Suez Canal, than we have already laid before the readers of the *Builder*. He has rather addressed himself to the political side of the question, his views differing from those which we have expressed rather in unveiled plainness of speech than in principle. He remarks, without however citing any authority, that the difficulty of keeping clear the channel at Port Said, at the Mediterranean end of the canal, is well known to the Pacha and his engineers. He adds that it is not difficult to cut through the bar, but that such cutting must be continually renewed, as the effect of the great piers will be to push the Nile deposit seawards; and that new bars will certainly form in front of the canal. Something similar to this was the opinion of Mr. Stephenson. The statement is denied by M. de Lesseps and his friends. As the opening of the canal is advertised for October, 1869, we shall probably have more distinct knowledge on this subject long before the completion of the Mont Cenis tunnel places us in unbroken railway connexion with the port of Brindisi,—unbroken, that is to say, from Calais. "I shall not rest," said King Ferdinand II. to an English engineer, "till you can enter a railway carriage at Brindisi and not step out of it till you reach Calais."

The feature of "Greater Britain" which, while exciting unqualified admiration in some readers, will cause pain in others, is the thorough-going partizanship with which it espouses the views of the dominant majority of the American Congress. It is hard for an Englishman to form an absolutely reliable judgment on the most disastrous event of modern civilisation. It is impossible for any man yet to tell what will be the result of that sanguinary and stubbornly contested war. And although we hold and always did hold that the North was in the right and the South was in the wrong, it may be well to suspend judgment as to some of the results. The broad and sound philosophy of which we welcome so many indications; the admission of the essential importance of the ethnological element, in all questions of politics, properly so called; the clear perception and honest admission that economics are not politics, and that what may be economically wrong may yet be, for a time, politically right; the kindly human feeling, that yet warms to the Teutonic rather than to the Latin blood, and evinces even a tinge of old English prejudice against our French neighbours—all these are too closely related to the principles which we have not unfrequently advocated in the pages of this journal to need any more formal expression of adhesion on our part. We may mark, in passing, the firm and level pace of the diction of at least the greater portion of the book, and the hearty appreciation of all that is good and noteworthy. There is a genuine sense of humour and love of fun, too, displayed in not a few of the pages. The list of the "titles" which the Americans "invented for their children," when the Scripture vocabulary was exhausted, is worthy of permanent commemoration, and the apothegm, "Let every man skin his own skunk" is worthy to rank among the raciest and most pointed proverbs of the older world.

The great ethnological question, Mr. Dilke agrees with us, underlies not only the form of political institutions, but that of civilisation itself. To inquiries as to community of origin, science as yet can give only vague and tentative replies; replies, however, which comparative philology is yearly making more articulate. But, come whence they may, the present distinctive features of race seem now to be only eradicable with the race itself. Among these features one of the most marked is that of adaptability to climate. Three centuries have not acclimatised the Teutonic blood in Hindo-

* "Greater Britain: a Record of Travel in English-speaking Countries during 1866 and 1866-7." By Charles Wentworth Dilke. In two volumes, with Maps and Illustrations. London: 1868. Macmillan & Co. Pp. 494, 423.

stan. Draw the line where you may, a zone, lying somewhere about the fortieth parallel of north latitude, divides the natural home of the white and the black races, speaking in the widest acceptation of the terms. Mr. Dilke has pointed out with truth that races, or families, that *whiten* by removal to hotter climates (as English children do in the South of Europe), cannot take root there. Labour, with the thermometer above 80 deg., is unendurable, permanently, by the Saxon races. It looks as if, intellectual labour became impossible to the brain somewhere about that temperature. Where the natural tillers of the earth, and working pioneers of humanity, cannot live their natural life, Nature exacts no toil from her dusky children. The fig, the cocoa-nut, the banana,—fruits innumerable,—require only the simple toil of plucking them. In the damp seaboard air, which is fatal to English life, through the long gloom of the tropical night, the races whose skin has a peculiar provision for resisting heat, dance and sing and chat after the unlaborious day.

It is with the utmost pleasure that we have accompanied our author in his scamper round the world. In such a flight he can but have given a glance here and heard a whisper there; but his reproduction of the impressions made on his own mind is clear and vivid. We believe it to be, for the most part, impartial and truthful. There is a great advantage in the perusal of a series of notes separated at once by so small an interval of time, and by so large intervals of distance. The contemporary life of the English-speaking races comes thus before us with greater reality than is the case when we read more patiently compiled descriptions. We fly with the author round the world, putting on the magic girdle, not in forty minutes, but in the time which it may take us to read, and at times to re-read, 800 pages of well-printed letterpress. Sometimes the glance has been, as is natural, a little too rapid, the whisper too partial. Thus Mr. Dilke expresses a wish for the destruction of the fort at Bombay; while the fact is, not only that the fort was destroyed before the end of 1864, but that it was the proceeds of the sale of the ground on which it formerly stood that had furnished the funds for the erection of the detached forts, the absence of which Mr. Dilke notes, and was intended, further, to provide means for filling the city with large public buildings,—a scheme which collapsed in the panic.

"Greater Britain" will be read with pleasure and with profit in, we doubt not, repeated editions. We are not yet sufficiently cosmopolitan to recognise, or to wish to recognise, a greater Britain. But we give our hearty good wishes to the book so called, no less than to that younger Britain at which it affords us so brilliant a glance. Such a journey was an admirable preparative for public life, and Mr. Dilke, who is now the Parliamentary Representative of the new Borough of Chelsea, will find the advantage of it throughout the career which lies before him.

THE MANUFACTURE AND USE OF TERRA-COTTA.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the ordinary meeting of the Institute, held on Monday evening last, a letter from Mr. Sydney Smirke was read, which stated that the new exhibition-rooms of the Royal Academy will be completed and opened for the reception of works next March, and it was a great satisfaction to him to be able to assure the members of the profession that their works will no longer be condemned to be crowded into a mere passage-room, as hitherto. There are (wrote Mr. Smirke) altogether fourteen galleries, none of which are less than 41 ft. by 31 ft., and not one of them is inferior to the rest in light or position, so that architects may now rely on justice being done to their productions. He expressed an earnest hope that architecture would be well represented on the occasion of the opening of the new Royal Academy, and that she would vindicate her position as one of the Three Sisters.

The subject fixed for this evening, was the discussion of Mr. Charles Barry's paper "On Terra Cotta," read in the previous session.

The discussion was opened by some supplementary remarks by Mr. Barry, who said it was commonly assumed that terra-cotta is nothing more than baked clay, or baked clay and sand, and a large proportion of the terra-cotta made use of in buildings recently erected, and now in progress, is of no other character. He did not consider that to be a worthy material for architectural purposes, and it was certainly very inferior to the ware used by him at Dulwich College. Terra-cotta, he said, to endure the severities of change in these northern latitudes, should be a hard vitreous body of a peculiar character. To compound such a body for cream-coloured ware, we must use Cornish, Devon, or Dorset clays, with ground flint, Cornish granite, sand, and old potsherds composed of like materials. If the colour is required to be of a warm stone hue, clay or marl from the oolite beds in coal measures are used to brighten the mixture; also sands containing protoxide of iron. Glazes are prepared from frits composed of Cornish granite, flint, red lead, soda, and borax. To these frits, after grinding, is added white or red lead, flint glass, and Cornish granite. The proportions in which these materials are used is the secret of the manufacturer, and the goodness of the ware will differ according to his scientific knowledge. Pecuniary considerations sometimes induce manufacturers to omit these materials, and a terra-cotta may be manufactured that is nearly equal, when new, in appearance to the best "body," but which is liable after a few years to disintegrate or flake on the surface. A perfect equality or homogeneousness of the body of clay used throughout the mass of blocks of considerable size is almost essential to durability. When this is not done the effect is to cause a cracking of the surface, which may probably end in the decay of the whole. After some further remarks on the composition and manipulation of the best qualities of terra-cotta, Mr. Barry observed, that one fruitful source of bad work in terra-cotta is the want of sufficient time being given for the air-drying, but it is so essential to the durability of the future work that it cannot be passed over negligently. If a piece of terra-cotta either bad in material, or imperfectly dried and burnt throughout, be soaked for four or five hours in equal parts of sulphuric acid and water it will lose in weight, and, when dried, will show efflorescence over its surface, and the liquid will be found to be charged with sulphate of alumina, or alum. As to the heat and weight of fuel required for burning in the kilns, to burn duly a body of such materials as he had described will require an equal amount of coal to the weight of the ware. As to the heat required there is difference of opinion, it having been stated by some at 3,000° Farenheit and upwards. One good test of the heat necessary to fire terra-cotta that shall be really durable, is to put it at the heat at which soft iron readily melts when introduced into the kiln. As to absorption of rain-water by terra-cotta in the building, Mr. Barry remarked that it was a pretty well established fact that the durability of stone and other materials for building is almost directly in proportion to their non-porosity. Since his paper was read he had had some experiments made on this point: pieces of terra-cotta, Portland stone, Bath stone, and Ketton stone of equal bulk, viz., 12 in. square and 2 in. thick, were thoroughly dried in a moderately-heated oven, carefully weighed, and then plunged into water, and left there for thirteen days. At the expiration of that time they were again carefully weighed, with the following results:—

Portland, dry, weighed, 22 lb. 10 oz.; wet, 23 lb. 6½ oz. Increase of weight, 1 lb. 6½ oz.

Bath, dry, weighed, 21 lb. 14 oz.; wet, 23 lb. 15 oz. Increase of weight, 2 lb. 1 oz.

Ketton, dry, weighed, 21 lb. 11 oz.; wet, 23 lb. 8 oz. Increase of weight, 1 lb. 13 oz.

Terra-cotta, dry, weighed, 20 lb. 9 oz.; wet, 21 lb. 8½ oz. Increase of weight, 15½ oz.

With these remarks he left the subject for discussion.

Mr. Blashfield, of Stamford (manufacturer of the terra-cotta used at Dulwich College), narrated the history of his connexion with pottery works applicable to architectural purposes, which, he said, arose in the first instance from his intimacy with the late Mr. Herbert Minton at the time that gentleman introduced tesseræ to public notice. About the year 1850 he (Mr. Blashfield) first began to make terra-cotta, the composition of which, and the method of manipulation adopted by him, were described in considerable detail. He urged the great importance of employing proper fluxes, which in the burning of the ware should become infused throughout the whole mass, by which alone durability of the material could be obtained.

Mr. Redgrave, jun., brought under the notice of the meeting some specimens of the terra-cotta used in the new buildings in progress at South Kensington, which, he said, differed entirely from the material employed by Mr. Barry at Dulwich. The question, he said, was not so much which particular clay was the best as which particular terra-cotta was the best as a building material. In the matter of clays he avowed himself a latitudinarian. The clay of which the terra-cotta used in the Albert Hall and the buildings at South Kensington was made was obtained from the coal measures commonly known as fire-clay, and which produced a material of the hardness and durability of which, he said, there could be no question; whilst elaborately prepared clay on which manufacturers had expended a vast amount of trouble had come to grief a few years after it had been put up in London. The terra-cotta at South Kensington was simply a fire-clay—almost a pure clay, which, after being ground fine, was mixed with a proportion of what is technically called "grog," or clay which had already stood the highest heat of the furnace, and is used to prevent shrinkage, which would destroy the straightness and beauty of the work. It therefore became a question whether a mixed material or a pure material best fulfilled all the requirements of the architect. He submitted that a great advantage in the use of a pure body was a uniform rate of shrinkage, which he said was of great importance when the material was used in lengths of several hundred feet in mouldings, &c. The superior capabilities of terra-cotta such as he had described to sustain weight as compared with ordinary bricks had been fully demonstrated; the crushing-weight in the former case being 100 tons, and in the latter 15 tons only. Directing attention to the specimens brought from South Kensington, he said they had in them an imperishable vitreous material, impervious to heat and moisture, and to all the influences of London atmosphere. He especially referred to the glazing and colouring, which, he said, were produced at very little cost, and only needed a second firing. Valuable as this material undoubtedly was, it was not a rival to stone or brick. For beauty of line stone would always maintain its supremacy; but in the use of terra-cotta they obtained a beautiful surface, and a variety of colouring, which could be obtained in no other known material.

Dr. Medlock made some observations upon cements in general; and pointed out the effects of the introduction of various silicates into the composition. With regard to the constituents of terra-cotta he submitted it was a subject which called for strict scientific experiment, in order to ascertain the proper proportions of the various ingredients employed, which he said was at the present time regulated by the rule of thumb, and not upon any fixed principles.

Mr. Canning (manufacturer of the terra-cotta of the Albert Hall and South Kensington Museum) said his friend Mr. Redgrave had entered so fully into the description of the material used by that gentleman in the structures to which he referred that little was left for him to add. He complimented Mr. Blashfield upon the great excellence of the ware exhibited by him, which he regarded as a very successful result of the rule of thumb described by the preceding speaker, considering, as was alleged, that manufacturers knew little or nothing of the components of the material with which they had to deal. As far as he (Mr. Canning) was concerned, he had only to deal with a very simple pure clay, as compounded by nature, and which had only to be dug out of the bowels of the earth, and moulded into shapes which architects directed. This, he said, was done without addition, excepting a little of the same material burnt and mixed with it, which they called "grog." That was all the mystery in the manufacture of terra-cotta, so far as he was personally concerned, for the last twenty years, and he was not aware of any failures having occurred. Having directed attention to his specimens of glazing and colouring, he expressed his readiness at all times to compare notes with his fellow manufacturers, and to cultivate a spirit of emulation among them which would benefit the trade at large, and tend to the more extended application of this material.

Mr. Etheridge spoke on the subject of the

valuable deposit of clay lately discovered at Watcombe, in Devonshire, which he said was between 80 ft. and 100 ft. in depth, and extended over a very considerable acreage. This clay, being in his opinion adapted for the finest class of pottery works, he regarded as one of the most important discoveries of the age. Mr. Morrell, who had made experiments with this clay, pronounced that all could be done with it that was done with the clay of the ancient Roman and Greek times, and the most beautiful objects of art had been manufactured from it. The shrinkage of the Watcombe clay was stated to be very small indeed.

Mr. Blanchard expressed a very high opinion of the clay spoken of, and with respect to terra cotta in general, it had been so fully treated of in Mr. Barry's paper, and the subsequent discussion upon it, that he felt he could not profitably occupy the meeting by any observations of his own.

Mr. Henry Doulton considered great credit was due to Mr. Blashfield for the high standard to which he had brought his terra-cotta. Special attention had not been paid to that material at the Lambeth Works, but lately some little effort had been made in that direction. The best test of the durability of terra-cotta was that of a sharp-pointed steel instrument. If it made an incision in the terra-cotta, the tooth of time would attack it; but if it turned the sharp point of the steel they might be sure it would be imperishable. The other test was that of acid, which in a short space of time would affect the material in a manner that it would take years of time to produce. He did not agree that fire-clays had any great advantage over other kinds if they required to be fired at excessive heat to make them imperishable.

Mr. Page, C.E., remarked that he had taken great interest in the development of the manufacture of terra-cotta, and was much gratified with what had been done by Mr. Barry at Dulwich College. He looked upon the revival of this material in that instance as an era in art, and he trusted it would be extensively introduced in all future buildings. Terra-cotta, he said, was a material with which even granite could not compare for durability. As one who had paid some attention to art, and who hoped to see the day when there would be no engineering work which was not also an artistic work, he begged to thank Mr. Barry and the other architects who had done so much to revive the employment of a very beautiful material in buildings of the present day.

Mr. C. F. Hayward mentioned the satisfactory results which had attended the use by him of terra-cotta supplied by Mr. Blashfield in a building he had erected in the vicinity of Plymouth. Speaking of the economy of the material as compared with stone, he stated that the cost of the triple-light windows with all the parts complete, and containing ninety pieces, was 6*l.* 11s. each, or 19*l.* 13s. for the three, and that of single windows 4*l.* 11s. each. The columns cost a little over 20s. each, and hollow blocks to carry weight, filled in by the contractor, cost 10s. each. The manner in which Mr. Blashfield and his principal workmen devoted themselves to the carrying out of his designs had given him the greatest satisfaction. He mentioned that in the progress of the works a strike of masons was threatened, and he believed the arrival of the terra-cotta had a very beneficial effect upon the men, and induced them to alter their mind, lest they might be deprived of the stone-work which remained to be executed by the substitution of a greater amount of terra-cotta than was originally contemplated.

Professor Kerr, in proposing a vote of thanks to Mr. Barry and to the visitors who had taken part in the discussion, remarked that the subject was one of great interest, introducing as it had done two separate schools in reference to this material of terra-cotta. Mr. Redgrave, as representing the operations at South Kensington, started a different idea from that which Mr. Barry and Mr. Blashfield had laid before them as regards the practical use of terra-cotta. Mr. Redgrave raised the question whether the material should be composed of natural clay or clay artificially compounded. He thought the argument in favour of the natural clay was scarcely borne out by the facts. The specimens of the South Kensington material, he believed, were from the natural clay, untouched by the tool before burning; whilst those exhibited by Mr. Blashfield had been tooled carefully before being placed in the kiln. Mr. Blashfield said, in effect, "Look at the fine arras and the smooth and perfect lines, and the refinement and finish of these specimens." South Kensington said, "We would rather have less refinement and more artistic 'touch.' On the other hand, Mr. Blashfield was content to sacrifice artistic touch for the sake of refinement; and he (Prof. Kerr) thought the English mind in the present Gothic day would prefer the latter. These were the chief points of difference between the two schools which remained to be determined in the future. The speaker having expressed an opinion unfavourable to the specimens of colouring exhibited, and a hope that it would never be employed for the beautifying of London, included in the vote of thanks the practical gentlemen who had taken part in the discussion.

Mr. Barry briefly replied upon the discussion, and the resolution having been passed, the meeting adjourned.

THE PROPOSED NEW BRIGHTON RAILWAY.

A PREGNANT comment on our remarks as to the suicidal policy of the Brighton and South-Eastern Railway directors, has been given by the Parliamentary notices just deposited. A new direct line, from the Dulwich station of the London, Chatham, and Dover Railway to Brighton, will be applied for in the ensuing session. The novel and commendable plan of issuing 1*l.* shares, for the purposes of survey, deposit, and Parliamentary expenses, has been adopted; the holders to have the prior right to the subsequently issued definitive shares, if the Act of Parliament be obtained.

With the whole country seething and foaming in the turmoil of the most heartily contested election that has taken place for the third of a century, it is impossible even to give a guess as to the manner in which the new Parliament will regard the rights and interests of the travelling, or indeed of any portion of the, public. If the new House of Commons prove to be so far an improvement on its predecessors as to have a definite, intelligible, and honest policy — we speak with reference to railways, be it understood,—the most probable event will be, that the existing companies will again bid for legislative protection, by proposing to bind themselves to a more equitable treatment of their customers. For all parties this would seem to be more desirable than the construction of a new duplicate line.

The daily journal which in very many quarters is looked up to as the most consistent authority on subjects similar to that of which we speak, has taken a tone with reference to the present application with which we do not altogether agree. The *Times* sees many and great advantages to be expected from the consolidation of railway management and the distribution of dividend over as wide a system of returns as possible. So do we. But we do not hold that, until this consummation is attained, the Brighton directors have no option but to adhere to the recent augmentation in their fares. We may yet have some time to wait before we are in a position to define exactly how much the net returns have been improved, or how much deteriorated, by a policy which has been so generally condemned; but it is our belief that the most fertile source of income is to be found in giving the utmost facilities to the travelling public. On no other view is the erection of enormous structures, like the Cannon-street and London Bridge stations, and the Thames bridges, to be for a moment justified. It is because we hold the recent action of the Brighton and their associated directors to be, not conservative, but retrograde, that we are of opinion that it is an unwise policy for the shareholders, as well as an aggressive policy as regards all those locally interested in the rate of fare. It is by good service, cheap service, and punctual service, that the utmost returns on the expended capital are, if we do not grossly err, to be obtained. The mere fact that the deposit for an opposition line has been provided shows, more distinctly than any words can do, the feeling with which the present management of the Kent and Sussex system of lines is regarded by the public. It speaks well for public spirit, under all the depression of the long financial stagnation, that proof should be given that the travellers who now reluctantly use the Brighton Railway will not fail to resist monopoly, unless monopoly shows some conscience. It is also highly encouraging to see so novel and so sound an application of the over-wrought principle of "limited liability" brought into practice. Either as affording the basis for an equitable arrangement, or, failing that, as an act of self-defence against monopoly, we look with pleasure on the project of the new Brighton Railway. What we most desire, however, is that the present company should render a new one unnecessary.

DECORATION OF ST. MICHAEL'S, CORNHILL.

CONSIDERABLE alterations, it will be remembered, were made at St. Michael's Church, Cornhill, between the years 1858 and 1860, including a new doorway next Cornhill, designed by Mr. Scott, and an elaborate series of carved benchends by Mr. W. G. Rogers. The interior was partly decorated also, and the windows were filled with stained glass by Messrs. Clayton & Bell, much of it very effective. Quite recently some considerable additional works have been done. Amongst other things, the reveals and columns of the aisle windows have been richly decorated with colour, and a scroll enrichment has been painted on the shafts of the main columns forming the aisles. A pavement of encaustic tiles by Minton has been laid. The north porch, next Cornhill, has been elaborately decorated, we might say over elaborately, and includes a biblical subject, creditably painted in oil by Mr. Brophey, in the head of the doorway opening into the church. A new cloister, leading from St. Michael's-alley to the churchyard, has been formed in Portland and Caen stone, with red Mansfield stone shafts and carved caps, executed by Beevers. For this part Messrs. Barnsley were the contractors. The decorative work has been done by Messrs. Trollope, under the direction of Mr. Herbert Williams, the architect to the parish, and his son, the assistant architect. The organ has been restored by Messrs. Bryceson, and an electrical arrangement is applied to enable the organist to play from one side of the chancel to the other. In the whole some 3,000*l.* have been spent. The church is well worth a visit.

SEWER VENTILATION.

ALTHOUGH the question of sewer ventilation has of late years engaged the attention of many thoughtful men, its importance has not been generally appreciated. The efforts of sanitary reformers to impress upon Boards of Health the necessity of sewer ventilation have been but partially successful. The reason of this may in a measure be owing to the fact that no satisfactory method of grappling with the difficulty has yet been discovered. Every engineer may have given the subject more or less consideration, but professional men have never discussed the question in a comprehensive manner. We are daily reminded of the importance of trapping the drains to prevent mephitic gases from entering human habitations, but seldom are we told that, under certain circumstances, sewer gases will find their way into dwellings notwithstanding traps and other ordinary precautions now in use.*

Gas evolved by decomposing organic matter is always dangerous to health. In small quantities it poisons the blood, and produces typhoid and those other diseases commonly termed *zymotic*. In a perfectly undiluted state the gas would cause instant death. Sewage should have sufficient velocity to prevent accumulation and deposit, but this degree of perfection has seldom been obtained. In well-regulated towns much is done by means of constant flushing to keep sewers comparatively wholesome; but, owing to the surface configuration in many districts, sewers are necessarily constructed with flat gradients, and, the velocity of the sewage being insufficient to keep the solid particles in a state of motion, a deposit is formed. It is well known that these deposits rapidly putrefy and evolve most dangerous gases.

In his evidence before the Select Committee on the Sewage of Towns, Dr. R. A. Smith states that sewage is oxidised even before it leaves the town, and that poisonous gases (especially carbonic acid gas) are evolved in large quantities. Whenever the temperature rises to about 54°, oxidation is intensely rapid. The gases will, of

* This has been often urged in our pages.—ED.

course, vary slightly, according to the nature of the sewage, but are generally as follows:—

Carbonic acid	95·0
Nitrogen	2·6
Sulphuretted hydrogen	2·0
Carbonic oxide, hydrogen, and carburetted hydrogen	0·4
	100 0

The temperature in sewers being never less than 54° these gases are produced in prodigious quantities. The motion of the liquids constantly exposes fresh matter to the influence of the air, and the solid matter deposited in the sewers or adhering to the sides being in an advanced state of decomposition the exhalations are of the most deadly character.

We naturally ask, What becomes of these gases? It has been supposed by some that the carbonic acid gas being heavier than air (its specific gravity being 15·29) finds its way to the outfall and is dissipated in the air: this is clearly an error; the law of gaseous diffusion, and the well-known habit of all gases to mix and diffuse themselves without reference to the force of gravity, militate against this theory. The constantly accumulating gas is soon rendered highly concentrated by the temperature in the sewers, and as soon as the pressure of this exceeds the hydrostatic pressure of the water in the traps it escapes. The bubbling noise not uncommonly heard in water-closets and sink-traps is caused by gas escaping in this way; moreover, sewer gases are extremely soluble: water readily absorbs more than its own volume of carbonic acid gas, consequently the water in the traps rapidly becomes highly charged with sewer emanations, which cause it to putrefy and evolve most dangerous gases into the apartment.

Carbonic acid gas is uninflammable, and is incapable of supporting animal respiration; it does not simply cause death by excluding oxygen as some other gases do, but is positively poisonous. It will cause death by its presence even if otherwise there be sufficient oxygen to support life. This fact cannot be too strongly impressed on the memory, that although a candle will not burn where there is less oxygen than will support life, it may burn where carbonic acid is present in sufficient quantities to destroy life: accidents have frequently occurred to persons ignorant of this important law, in sewers and in brewing-vats where fermentation is carried on.

The system of ventilation adopted in London and Paris is simply to insert an iron grate over the manhole, and allow the gases to escape into the streets, without passing through any process of deodorisation. The advocates of this method have received encouragement from Mr. R. Rawlinson, who has omitted no opportunity to bring the matter under the notice of municipal authorities. Some years since, before water-closets came into general use, street gullies were left untrapped, and no inconvenience was experienced; but after water-closets became common the sewers were made receptacles for everything foul and unwholesome. The nuisance soon became intolerable, and the cry was raised, "Trap the gullies!" The gullies were trapped accordingly; but it was quickly found, that instead of the streets, the houses received the contaminated vapours. We have now to consider what we are to do next: shall we adopt some means of ventilation not hitherto tried, or shall we revert to the old system of untrapped gullies?

To allow foul gases to escape into the streets will cause a nuisance in proportion to the necessity for ventilation. The gases will come up under our very noses, and will be received into our lungs before any very extensive mixture with the atmosphere can possibly take place. Those who advocate the open grate system frequently quote the death-rate of London and Paris as convincing proofs of the correctness of their arguments; but they forget to consider the peculiarities of those cities, which make them quite exceptional, and their example of no practical value to towns differently situated.

The bill of mortality does not give a correct history of the sanitary condition of any place. For instance, a healthy and salubrious neighbourhood may show a higher death-rate than a dirty and notoriously unhealthy place; and for this reason, that invalids congregate there in large numbers, many of whom do not recover, and their deaths go to swell the average of a small population. The converse holds equally good. Large and wealthy cities are centres to which men of means are attracted. These live in comfortable and healthy dwellings, in clean and aristocratic districts, and of course live longer than their less favoured neighbours. Again, although London is not blessed with a constant water supply, the dilution of the sewage is much greater than in any other considerable town in England. The sewer gases are, therefore, less noxious, as the excessive quantity of water tends to keep the sewers wholesome. The same applies in Paris, where there is no attempt at trapping, and no need for it, as the "soil" is collected in cesspools, and does not pass into the sewers. The streets are also washed with vast quantities of water, and the sewers are flushed every day.

The open-grate system is so barbarous that we dismiss it from further consideration. It may continue in use for a short time, but like other *expedients* it must soon be abandoned, and something more worthy of this progressive and scientific age be introduced.

No plan of sewer ventilation ought to be entertained which is not perfectly self-acting, and in which the first cost does not cover the whole expense likely to be incurred, as it is well known that municipal authorities in their zeal to cut down expenses have sometimes fallen into the grievous error of neglecting preventive measures as soon as all fear of an immediate epidemic outbreak has passed.

To disinfect sewer gases before they can reach the street, vegetable charcoal spread lightly on a perforated tray or basket has been fixed in connexion with the manholes or the gullies. When dry it effectually purifies the gases, but as it absorbs water rapidly it requires to be renewed frequently. The steam and damp vapours from the sewers will in a short time render it useless. Elaborate and expensive ventilating chambers have been erected in West Ham and some other places, the object being to purify the gases by means of charcoal before they escape. This process is theoretically correct, but its practical value is very doubtful, owing to the charcoal absorbing damp and becoming impervious.

It has been proposed to connect the sewers with factory or other chimneys, so that the gases may either be consumed in the furnace or be discharged into the air at a great elevation. I have tried this method, and have reason to believe that with care it may be made perfectly successful. The expense of building special chimneys and keeping up a furnace would be too great to be entertained, unless all other reasonable schemes result in failure; but if a factory chimney exists near the summit of a sewer a connexion can be made with very little expense. An enthusiast once proposed to ventilate all the sewers of Manchester by means of one immense chimney and furnace, to be erected in some central situation: fortunately this proposal did not meet with much favour. If a central chimney and furnace should be constructed so as to extract air from the sewers, no benefit would be felt more than a certain distance from the furnace; as the air would be drawn with the force of a hurricane into the sewer, through the gullies and traps in the neighbourhood; while the sewers at a distance would not be affected in the slightest degree. We see no chance of successful ventilation other than by establishing outlets at frequent intervals.

Rain-water spouts have been used in some instances; but the objections to this system are numerous. During heavy storms, when the sewers are being rapidly filled with water and when some outlet is specially required, the spouts are required for their legitimate function; besides which, leaves and birds'-nests cause frequent obstruction and stoppage. The gases would, moreover, be discharged into the immediate neighbourhood of bedroom-windows, an objection which cannot be overlooked or excused.

The corporation of Liverpool has recently incurred great expense in the endeavour to solve this all-important mystery. Until last year there was no attempt at ventilation, and the sewers were in a most unwholesome condition; but after some discussion it was decided to ventilate freely, and during that year 1,000 ventilators were constructed. The sewers are now comparatively wholesome. Iron shafts or chimneys, about 8 in. in diameter, with revolving tops, in connexion with which is an archimedian screw, to cause a constant upward draught, have been fixed in corners or recesses. These shafts are joined to the sewers in convenient places, and are also carried far above any windows, so that there is no danger of particles of poisonous gases finding their way into human habitations. These shafts have been found to answer their purpose admirably. A great reduction in the rate of mortality has taken place since their adoption. This fact alone speaks volumes in their favour, besides which they are not very expensive, require no attention, and do not cause inconvenience or annoyance to any one.

There is probably no subject of every-day interest so little understood or regarded as this now under consideration. In almost every house complaints are made of "*bad smells*" arising in the neighbourhood of the sink-stone, but a kind of intuitive horror of *trouble* prevents the householder from taking steps to protect himself and family from the evil effects of vitiated atmosphere. Generally sink-stones are fitted with what are called "*bell-traps*." These are supposed to keep down all bad smells, and at the same time allow water to flow away freely. In practice, however, the water does not get away fast enough, and the traps are removed. The course is thus left quite open for the escape of gases, which quickly penetrate into every room, filling the house with a deadly poison, which destroys the stamina of our town populations, and lays the foundation of many of the diseases from which humanity is doomed by its own ignorance or carelessness to suffer. V.

TECHNICAL INSTRUCTION.

This subject appears to be making satisfactory progress and creating a good deal of interest. During the past few weeks the provincial papers have reported meetings which have been well attended by a good proportion of the working classes, who do not as a rule give much attention to educational questions. The meeting at Huddersfield was presided over by the new mayor, the place having recently become a corporate town, and men of all shades of political and religious opinion took part in the proceedings. At Sheffield the Rev. Canon Sale presided; at Newark, the mayor; at Burslem, the Right Hon. C. B. Adderley, M.P. At the latter meeting Mr. Beresford Hope, M.P., Mr. Melley, M.P., Mr. Roden, and Mr. Buckmaster, from the Science and Art Department, delivered instructive and appropriate speeches. The importance of scientific instruction is making steady progress, and in many places evening classes are now in operation for instruction in science.

Classes are about to be established in Liverpool for imparting practical and theoretical instruction in the mechanical arts and sciences, and to afford opportunities to the working classes of competing for the prizes and medals of the Science and Art Department, as well as for the Whitworth scholarships. A sub-committee of the School of Science, aided by one or two large employers of mechanics, have met to carry out the scheme. A suitable teacher will shortly be appointed (the committee having already one in view), who will be remunerated partly by the School of Science, and also by students' fees (which will, however, be very low), and by the grants given by the State. It is considered highly desirable that a chair of engineering science should be endowed, and, as the books required are expensive, it is hoped that liberal donations will be forthcoming to aid these desirable objects.

A public meeting has been held in St. Mary's National School, Lewisham, for the purpose of organising classes for instruction in geometrical, mechanical, and architectural drawing, under a science teacher, certificated by the Department of Science and Art. Mr. Buckmaster attended from the Science and Art Department, and delivered an address, in which he encouraged the young men to earnest work, and said that success in life depended more on continued effort than extraordinary natural gifts. The classes will commence at once.

A public meeting has been held in the Grammar School, Daventry, for the purpose of inaugurating a class for instruction in magnetism and electricity, which will be conducted by Mr. Rigby, a certified science teacher. The mayor, Mr. W. Line, presided, and briefly introduced Mr. Buckmaster, who delivered an appropriate address, which was well received.

A large meeting has been held in the County Hall, Abingdon, on the occasion of the second annual distribution of the "Queen's" and local prizes. The mayor occupied the chair. The secretary reported the excellent success that has attended the labours of the master (Mr. E. J. Gubb) and crowned the commendable application of the pupils to their study in the past session.

The first annual meeting for the distribution of prizes to the students in the Science and Art Classes, at Northampton, gained in the recent examination, has been held in the Town-hall, Earl Spencer presided. The science classes have not been established more than six months, and the late examination was the first, therefore, that had been held. The result is regarded as very encouraging. The classes are already equal in number and success to those in the largest towns in the kingdom, and the Inspector of Science Schools for the Midland District (Mr. G. C. Bartley) speaks of them in high terms. In the fifteenth annual report of the Science and Art Department, Mr. G. C. Bartley says,—"The science classes in the Midland districts are in a flourishing condition, particularly the one held at the Guildhall, Northampton." These classes were established in October last, and in five months after their establishment the students were examined in free-hand drawing, in geometry, in perspective, and in model drawing. Sixteen students were successful in free-hand drawing, six of them taking prizes; ten students were successful in geometry, one taking a prize; four students were successful in perspective, two taking prizes; and nine students were successful in model drawing, one gaining a prize. There were other successes among the students.

TECHNICAL INSTRUCTION FOR THE BUILDING TRADES.

A MEETING on this subject has been held at Bradford in connexion with the building trades. Its purpose was the inauguration of classes for the operatives and apprentices employed in the Bradford building trades. In connexion with the trade of the joiners there has been formed a board of conciliation and arbitration, which it is hoped will extend to the whole of the building trades. The early workings of this Board are hopeful for the future. The proposed schools originate with this board of arbitration, and though the joiners have the honour of their foundation, it is hoped that all the building trades will share in their advantages. The objects sought were stated by Mr. A. Neill, the umpire. The meeting was enthusiastic in character, and the speeches of the several gentlemen who addressed it were loudly cheered. The proceedings were commenced with tea, and about 300 persons sat down. The classes have commenced, and are to meet twice a week in the Unitarian school-room, the services of an efficient and practical teacher having been secured.

THE TECHNICAL INSTRUCTION MOVEMENT IN SCOTLAND.

THE President of the Royal Scottish Society of Arts, Mr. George Robertson, C.E., in an able address to the Society on the 9th inst., treated chiefly on the subject of science education. In the course of his address he said:—

"The question as to the exact character of the schools, graded or otherwise, it would be desirable to establish, on the large scale of a purely technical nature, such as those on the Continent, I do not think (and I say it with deference) can be settled just at once. In the present state of matters the country is hardly ripe even for immediate, certainly not for hasty action in this respect. Full use is not made of the technical institutions now in existence, such as the School of Mines; and a healthy and not spasmodic demand must first set in before any purely scientific establishment on a large scale would be quite free from the risk of failure."

"Professor Huxley says that this want of success is because the great mass of the manufacturing interest do not, even at the present moment, understand that such instruction in the groundwork of technical education is what they want to prevent their manufactures going to ruin."

"After all, perhaps, the most valuable and practical way of promoting scientific education is to rouse up interest and convince the employers of labour of its value. Were the manufacturers all over the country thoroughly convinced of this, and determined to show that they appreciated it, by promoting and giving higher wages to those workmen who were technically trained, they would rouse up such a demand as would satisfy the most ardent well-wishers of the cause. It is the employers of labour who may be said to have the great prizes of life to give away, in comparison with which all the medals and certificates a department can grant are only the means towards an end. If the artisans who are employed in engineers' shops find that they get on because they know the principles of mechanics; if those who are engaged in dye-works, glass-works, and the like, find that they advance because they know something about the science of chemistry; if the stonemason finds himself promoted because he is acquainted with descriptive geometry and drawing; if the miner finds himself the captain of a mine because he understands geology,—then, there will be no fear for the technical education of either the present or the future race of artisans. And if the rewards of life, whether at college or in professions, be in like manner thrown more open to science-trained men, there need be still less fear for the education of the middle and upper classes. Teachers and schools of science would soon spring up if the people found that science would 'pay.' The demand having once been created, it is against all the experience of commerce if the supply does not keep pace with it."

SCHOOLS OF ART.

The Oxford School.—The annual meeting for the distribution of the awards to the successful students of this school took place in the Town-hall, which was very large and influential audience attended. The Lord President of the Council of Education (the Duke of Marlborough) occupied the chair. His Grace opened the proceedings in a suitable address. In it was considered the bearing of art upon the prosperity and commercial institutions of the country, the growth of it since the Great Exhibition of 1851, and the position which it occupies in England at the present time. The Rev. C. L. Wingfield read the Government report, which was very satisfactory, and the list of those pupils who had obtained Government prizes and certificates. The chairman said it was a gratification for him to know that Mr. Macdonald, the master of the Oxford School of Art, had been awarded a bonus of 10*l.* during the past year. The Department was anxious to do what it could to increase the number and efficiency of these schools, and he trusted the public would give them credit for the exertions they were making in order that the money which was freely given by the public might not be bestowed in vain. In conclusion he signified his intention to give a donation of 10*l.* annually to the funds of the school.

The Bristol School.—The prizes have been distributed to the successful pupils of this school at the recent Government examination. The Mayor occupied the chair. The report stated that the school is in a satisfactory position so far as the success of its students can be a test; nevertheless, the debt of 655*l.*, and the decrease of annual subscribers, continue seriously to retard the expansion of the school.

The Ipswich School.—The public distribution of the prizes awarded by the Government Inspector at the last examination, took place in the School of Art, Northgate-street. There was a large and interested audience. The Rev. C. H. Gaye, rector of St. Matthew's, presided. Three pupils have won for themselves free studentships. Mr. W. T. Griffiths, the master, said this school almost stood alone in one respect—it had no subscriptions. In other towns they would generally find a long subscription list. They had been established ten years, and had not come upon the inhabitants for one farthing, excepting for such expenses as were connected with the fitting out of the room at the outset. It had been supported entirely by the fees of the students. Those fees were drawn up so as to meet all classes, and the teaching was of an essentially practical character.

The Coventry School.—The annual meeting of this school has been held in St. Mary's Hall. Mr. James Darlington presided, and there was a numerous and influential attendance. The annual report says:—

"The friends of the Coventry School of Art may fairly look upon the past year as the most successful of its existence. The South Kensington Department of Science and Art has this year awarded to it one silver and three bronze medals, an increased number of book-prizes, an increased number of successful examination papers, one national scholarship, seven free studentships, and a bonus of 20*l.* to the master in recognition of his success.

The total number of students who have attended the school during the year has been 155, and although the hot summer caused a temporary falling off, the attendance has been very regular.

The Department of Science and Art has this year awarded eight book prizes for drawings in the elementary stages, against five last year; one also secured honourable mention. Twenty-one works were selected for national competition, against sixteen last year; to one of these a silver medal was awarded, three had bronze medals, and one a book prize. Last year, one bronze medal and three book prizes were obtained.

The examinations in freehand, model, geometrical, perspective, and mechanical drawing, held in March last, were conducted under the superintendence of the local committee. The number of students who passed is 85, against 27 last year. The number of successful papers 50, against 36 last year.

Seven scholars have had free stewardships granted to them for one year by the Department of Science and Art, and Mr. John Frost has succeeded in obtaining a national scholarship, with an allowance of 1*l.* per week, for one year. These scholarships are now given to a limited number of the best students who are, or intend to become, professional designers for manufacturers, or art workmen.

Bonuses, consisting of one sum of 50*l.*; three of 40*l.*; five of 30*l.*; ten of 20*l.*; and twenty of 10*l.*, were this year awarded to the head masters of schools of art in which the results of instruction, as tested by the examinations of the department, were the most satisfactory. Of these Mr. Anderson obtained 20*l.*, this school being the fifteenth on the list, which comprises altogether 102 schools."

The Taunton School.—The annual meeting for the purpose of distributing the prizes awarded to this school by the Department of Science and Art has been held at the school. There was a good attendance. The company first examined the works of art executed by the master (Mr. John Rowe) and the pupils during the past year. The drawings and sketches by the students numbered 141, embracing all the stages of instruction; and were supplemented by thirty-one studies in oil, water-colour, chalk, and pencil by Mr. Rowe, all from nature, with the exception of a copy of Titian's Ignatius Loyola. The productions of the students were executed in the morning and evening classes of the school. Six of the students' works were selected by the Department for national competition, and of these Mrs. Malet's gained the distinction of Queen's prize. The Rev. W. Arthur Jones (honorary secretary) read the report, which said:—

"The committee have the satisfaction of congratulating its friends and supporters on its continued efficiency and on the success with which, under the able direction of the head-master, Mr. Rowe, the pupils of the school have pursued their studies during the past year. The payments on results received from Government this year have been more than double the amount received from the same source last year. This circumstance is especially encouraging, because it is a sure and undoubted proof of increased diligence and activity on the part both of pupils and master."

A stirring address to the students was given by the head-master, and the meeting was also addressed by Mr. Malet, the chairman, and the hon. secretary.

The Newcastle-under-Lyme School.—The annual meeting of this school has been held in the town-hall. It was well attended by the pupils and their friends, a large proportion being of the working classes. Mr. W. S. Allen occupied the chair. The report of Mr. Bacon, new head-master of the Stoke schools, was read. The reporter said:—

"I am glad to state this sixty-eight students have availed themselves of the instruction offered in the classes. Sixty-one students attended in the evening and seven attended the private classes which met in the morning.

In March an examination, conducted by members of the committee in accordance with the Science and Art Department's regulations, took place. Sixteen students presented themselves and were examined. Of these, ten passed and three obtained prizes.

The drawings which were finished in the school during the previous twelve months were sent to London in April to be examined. The works of ten students were satisfactory, three obtained prizes, and one honourable mention. At the National competition, at which about 100 schools competed for ten gold, twenty silver, and fifty bronze medals, one bronze medal was awarded to this school. Two of the students, viz., W. P. Rhodes and T. J. Watkin, have been appointed free students, the Science and Art Department paying their fees for twelve months."

The meeting pledged itself to give support to the school, fully recognising the importance and advantages which such an institution offered to the locality.

A Sherborne School.—It has been resolved at a public meeting that a local school of science and art, in connexion with the Department of Science and Art, shall be established with as little delay as possible. A committee and secretaries were named, and it was stated that Mr. Fraser, who is conducting the school of art at Salisbury, will probably undertake the duties of conductor of the Sherborne school, assisted (*pro tem.*) by Mr. Stephens, the master of the Sherborne National Schools.

ST. SAVIOUR'S CHURCH, PRESTON, LANCASHIRE.

THIS church was consecrated on the 29th ult. by the bishop of the diocese. It consists of a broad nave and north aisle, the latter sufficiently wide and lofty to receive a spacious gallery without extending up to the arcade dividing the two.

The east window has detached shafts, carved capitals, with moulded archivolts, internally, and plate-tracery of a simple and early type. The communion-rail and standards are wrought in iron, decorated with colour and gilding.

The chancel and footpace are paved with Godwin's tiles. The chancel-stalls have open fronts, and the bench ends are decorated with the symbol of the Christian faith, and an ancient monogram expressing the name of Christ in Greek, by the use of the first letters of that name combined. The pulpit is the gift of Mrs. Newsham. It is of oak, with polished stone substructure and steps.

ST. JAMES'S CHURCH KIDBROOKE.—CARVED CAPITALS: GAS FITTINGS.

The organ remains to be added, together with the prayer-desk; the present one being temporary. The lectern is an eagle, of very old oak.

The roof-ridge of the chancel and nave is continuous, but the point of separation is marked by greater richness and size of the principals, the curved rafters of which are decorated with various devices of a symbolic character, as the cross and the emblem of the Trinity. At the apex is a conspicuous emblem of the Holy Ghost as a descending dove.

The wall principals at the east end are similarly decorated, and the emblem at the apex, directly over the communion-table, where the sacrifice is commemorated, is the Lamb of God. The roof principals over the sacrarium are decorated with conventional representations of the vine and the passion flower. The stone carving is also symbolic in many instances. The two corbels to the chancel principals represent angels.

The gas-standards are Skidmore's work. The gallery ceilings are divided into bays by the supporting timbers, decoratively treated, and each bay is further ornamented with coloured stencil bordering. The space below the west gallery is immediately near the principal entrance, and being partly screened off from the open nave, forms a quasi narthex or vestibule. Here the font will be placed, the present one being only temporary. The sacrarium window is filled with Powell's stamped quarries, and represents the sacramental elements in the forms of wheat and vine. The east end is about to receive a large memorial window, the gift of Mr. Edward Swainson, by Ozell, of Paris, the subjects being figures of Christ and the four Evangelists. Messrs. Hardman, of Birmingham, are also commissioned by the widow and family of the late Mr. John Smith and the architect with two memorial windows for the west end, of their best workmanship, the subjects being respectively "Christ Blessing Little Children" and "The Harvest of the World, and the Putting in of the Sickle."

The completion of the exterior requires the tower in its upper stages, the enclosure of the site, and the removal of the cottages in Queen-street. The principal entrance under the tower is surmounted by a medallion of the head of Christ. The west windows of the nave and aisle have tracery of an early character. Stone crosses surmount the east and west gables of the nave, and over the aisle gable is a crown of thorns in wrought-iron work.

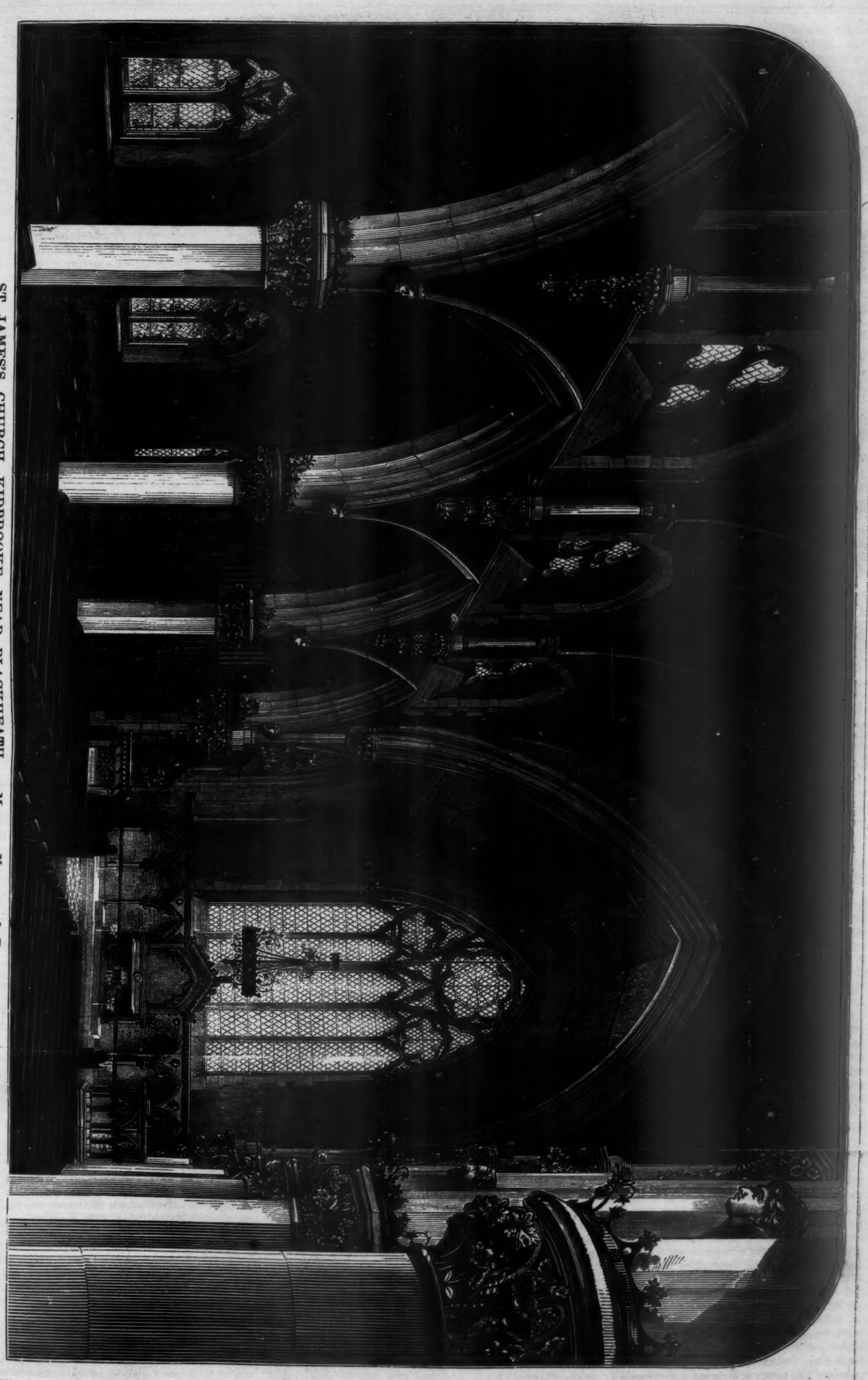
The architect was Mr. Hibbert. The whole of the carving and parts of the decorations have been contributed by various persons interested in the church, without trenching upon the general building fund.

THE EDUCATIONAL PRIZES AT THE POLYTECHNIC INSTITUTION.—The prizes and certificates from the Society of Arts, the Science and Art Department, City of London College, and Royal Polytechnic have been distributed to the successful candidates of the evening classes at the Polytechnic. The gold medal of the Science and Art Department was gained by Mr. W. J. Wilson, engineer's clerk, and the silver medal by Mr. Robert Wilkins, clerk, both for animal physiology. Besides three bronze medals, various books, money prizes, and certificates were distributed.

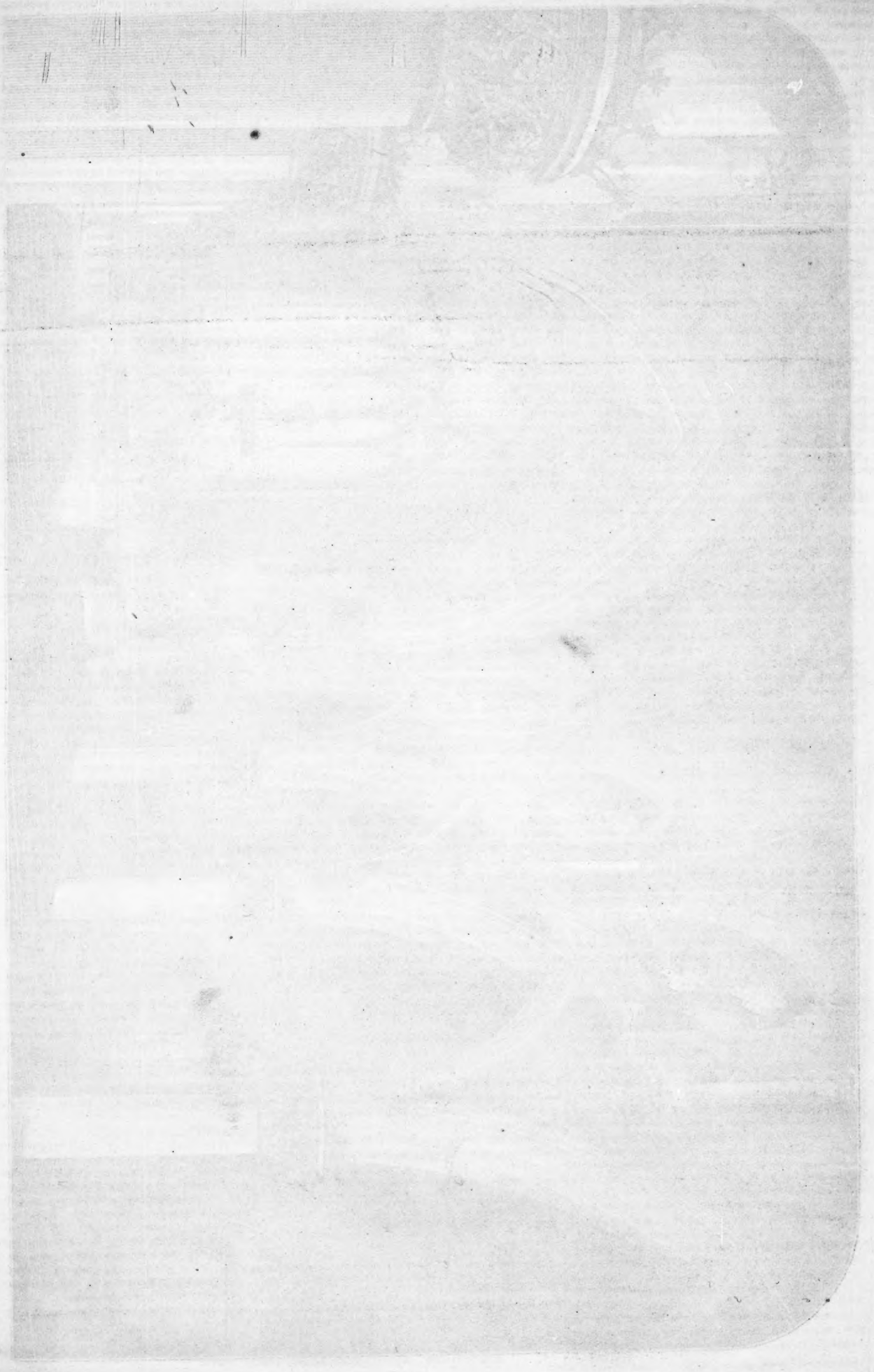
SAINT JAMES'S CHURCH, KIDBROOKE.

IN consequence of the rapidly increasing demand for residences near Blackheath, the land adjoining became eligible for building purposes. The freeholder of a large estate at Kidbrooke, Earl St. Germans, having offered a site for a church and rectory, steps were taken in 1866 to build the former, which resulted in the erection of the church of St. James, Kidbrooke, and a parish was accordingly formed. The church was consecrated by the Bishop of Rochester in July, 1867. It contains accommodation for 1,000 persons, and cost, exclusive of the organ, reredos, pulpit, fences, lighting, &c., about 7,000*l*. The plan consists of nave, aisles, and chancel, with a tower and spire 160 ft. high at the east end of the north aisle, and a vestry on the opposite side. The organ-chamber is formed on the ground-floor of the tower.

The reredos, pulpit, reading-desk, and font, which are wrought in Caen stone, with alabaster and marble columns introduced, as well as the carving generally, were executed by Mr. Seale, of Walworth, from the designs of the architects. The church is built of brick with Kentish rag-stone facings, and Bath-stone dressings. The pewing and stalls are of deal, stained and varnished. The aisle passages are paved with red and black tiles, and the chancel is laid with encaustic tiles. The whole of the windows are filled with geometric tracery. The east window, which has five lights, will shortly be filled with stained glass by Messrs. Ward & Hughes, at the expense of a lady in the congregation. The organ is by Robson. The architects employed were Messrs. Newman & Billing; and the builders Messrs. Dove, Brothers.



ST. JAMES'S CHURCH, KIDBROOKE, NEAR BLACKHEATH.—Messrs. Newman & Billing, Architects.



THE LATE MR. EDWARD WELCH, ARCHITECT.

We regret to hear of the death of Mr. Welch. He was born at Overton, in Flintshire, in 1806, and died at his house in Southampton-row, Bloomsbury, on the 3rd of August. In former years he was in partnership with Mr. Hansom, and the Birmingham Town-hall was built by them conjointly, the firm being "Hansom & Welch." They also built St. John's Church, Toxteth Park, Liverpool; the Beaumaris County Gaol; the Terrace and the Bulkeley Arms Hotel, Beaumaris; a church in Hull; the Dispensary, York; King William's College, Isle of Man; and several churches there. The firm suffered greatly through the building of the Birmingham Town-hall, and their sureties, or rather the sureties of the builders, Kendall & Thomas, lost all the money they had advanced to assist the building, amounting, we believe, to something like 4,000*l.* or 5,000*l.*; but Mr. Welch's father, as one of the sureties, was compelled to pay a further sum of 1,000*l.* to get rid of his responsibility. This loss to the sureties was a great grief to Mr. Welch for many years, and he did all he could to repair the damage, but the hard world said a contract was a contract; and though subscriptions were raised to indemnify the sureties, the amount collected was but very trifling.

Mr. Welch, alone, was the architect of the Northern Hospital, Liverpool, and several churches in and around that town; the Monk's Ferry Hotel, Birkenhead, &c. Of late years he had devoted his attention to the ventilation and heating of houses by means of a hot-air chamber behind the ordinary fire-grate, and latterly had succeeded well in the application of the principle, especially on a patent taken out in 1865. The St. Pancras Relief Office, designed by Mr. Robins, was recently provided with Welch's stoves; and the same architect, with *one* of these stoves, has since arranged the warming and ventilation of *three* apartments,—the hall and a room besides that containing the stove,—in a residence at Godstone.

Mr. Welch was highly esteemed by all who knew him intimately. He was a man of liberal and expansive ideas, and generously open to the merits and abilities of others, while modestly undervaluing his own.

THE DRAINAGE OF OXFORD, ETON, WINDSOR, AND ABINGDON.

A Report on this subject by Colonel Ewart, of the Royal Engineers, commanding in the London district, has been made to the Home Secretary, and printed by his order. The reporter recommends the separate system as explained in the treatise on "Sanitary Management and Utilization of Sewage," by Mr. W. Menzies, Deputy Surveyor of Windsor Forest and Parks. At the conclusion of his report the reporter says:—

"I report to her Majesty's Under Secretary of State to the Home Department as follows:—

1. That the 'separate system,' of drainage as above described, is the proper principle of drainage to be adopted in the towns of Oxford, Windsor, Eton, and Abingdon.

2. That a complete system of sewers should be laid out in the above-mentioned towns, to receive all the sewage matter of the towns; and that such sewers, so far from being of such a size as to enable a man to work in them, should be of such dimensions only as may be sufficient to afford a passage to the sewage matter.

3. That the rainfall should not be allowed to enter into the foul sewers, but should either be stored in tanks for domestic use, or be allowed to flow into its natural channels, care being taken, in the event of its running into a river, that it is freed from noxious impurities by careful scavenging of the streets, or, if necessary, by passing it into settling beds before allowing it to enter the stream.

4. That, as soon as possible, a complete system of water supply should be provided where it does not already exist, and arrangements should be made for enabling such supply to be used for flushing the sewers.

5. That the water and sewage works of each town should, if possible, be under the control of the same local authority.

6. That all drains communicating with the foul sewers should be trapped where in connexion with the houses, and elsewhere when necessary; the traps to be beyond the control of the inhabitants; bell-traps to be considered inadmissible.

7. That stables or cow-houses should have surface drainage carried through the walls into trapped cesspits, clear of the walls, and thence enter the foul sewers. Examples of which may be found in recently constructed Cavalry and Artillery stables.

8. That refuse from gas and other factories, when injurious to vegetation, should be collected into a tank at each establishment previous to the drains from it entering the public sewer, and the noxious constituents be separated by precipitation and filtration; the deposited matters to be frequently removed at the cost of the manufacturer.

9. That proper ventilation be provided for all the foul sewers. Ventilating shafts should be carried above the level of the highest windows of the houses, and to such a height as to prevent the noxious gases being blown down the chimneys; the shafts to be connected to the crowns of the sewers by air pipes, and ventilation in no case to be effected by rain-water pipes.

10. That a sufficient area of land be selected and purchased, or leased, for the purpose of being laid out for irrigation; and that the sewage be conducted over or through that land in such manner as not to create a nuisance, and to entirely disinfect the sewage matter. The 'carriers' should be covered.

11. That the total quantity of land required will depend upon the nature of the subsoil; but as a maximum, two-thirds of an acre per 100 of the population will suffice, although it would be better to provide one acre per 100, in order to admit of farming the lands subject to the judicious rotation of crops."

The true method of dealing with the subsoil water in the valley of Thames, the reporter adds, must depend on an efficient method being devised of bringing the river under control.

An appendix to the report contains memoranda, after inspection, as to the Bedford sanitary improvements.

FROM IRELAND.

Lurgan.—A new town-hall has been opened here with Masonic ceremonial. The building, which was commenced early in the summer, is modern in style. It is three stories high, and the interior consists of two large rooms and a basement story. The dimensions of the building are,—length, 105 ft.; breadth, 36 ft.; and height, 64 ft. The basement story, which is intended to be used as a poor-law dispensary and butter market, measures 101 ft. by 22 ft. The second floor, which is almost on a level with the street, is intended to be used as a town-hall and assembly-rooms. Its length is 86 ft., and width 36 ft., and at the north end of the hall there is an orchestral gallery capable of accommodating sixty persons. The body of the hall, it may be stated, would seat 500 persons comfortably. The upper room, which is lighted by thirty-two arched windows, will, when completed, be used as town commissioners' board-room, town clerk's office, and for other town purposes. The estimated cost of the entire building is about 2,000*l.* The architects were Messrs. Young & M'Kenzie, of Belfast; and the builder Mr. John Archer, of Lurgan. The new hall, which is almost completed, is built on the vacant space between the police barrack and the Mechanics' Institute, in Union-street, and is connected with the latter building. The gasfittings for the hall were put up by Mr. Stewart, of Belfast, assisted by Mr. John Long, of Lurgan.

FROM SCOTLAND.

In Dunfermline there have been a considerable number of erections of different kinds during the last two years. Three large power-loom factories, besides extensive additions to a number of others, a new foundry, and a number of dwelling-houses have been put up. At the present time the burgh intend erecting new public slaughter premises. They are shown on the plans to cover three-quarters of an acre. The extended burgh boundaries are intended to be drained, and the streets properly repaved. Feus at Comely Park are rapidly being taken off for building purposes. There are two villa residences at the above place, nearly completed. Mr. Maccallum is the architect.

PROVINCIAL NEWS.

South Shields.—Messrs. Wright's new premises in Dean-street consist of one large shop for general business, a suite of private offices, entered from Dean-street and Ferry-street, a bond store of three stories, with the groundwork laid for another bond, both in Ferry-street. There is also in Dean-street a preparation for shop extension, with a large suite of offices on two floors above. The character of the building is Byzantine, worked out in plain red and white bricks. The windows are relieved with double reveals, stopped by quarter rounds, and splayed on different outlines. The front is broken by corbelled pillars and strings, worked into dentil blocked bed mouldings, and terminated by a cornice, also having a dentil blocked cornice, relieved with white brick recesses. The whole is slated and finished with a ridge cresting. The shop will be lighted by two gaseliers, instead of the ordinary burners. The size of the shop is 84 ft. long, 24 ft. wide, 19 ft. high, and fitted with British plate-glass of very large size. The architect was Mr. Martin Greener, of Sunderland and South Shields. Messrs. Wright & Son have just given a dinner to a number of friends and the workmen who had been employed in the construction of their new premises. The party numbered about 100.

Upwell.—The new Public Hall has been opened by a *conversazione*. Upwell contains a few public-spirited men, who last year formed a gas company and erected gas-works; this year they formed another company, and so raised funds for building the public hall, with the idea that by supplying it with books and newspapers, and the delivery of scientific and moral lectures, the young men might be kept out of the public-houses, and their minds instructed by rational amusement; it is also designed to impart sociability among the upper and middle classes, too little known to each other by reason of the scattered nature of the fen farms and the indifferent roads. Concerts, balls, tea-parties, &c., in the Public Hall will bring together the persons now isolated; angularities will thus get rubbed off, and friendships be made for the general benefit of all. Mr. C. W. Townley presented the site, which is near the church. The new building has been erected by Mr. William Elworthy, of Upwell, from the design of Mr. R. Reynolds Rowe, F.S.A., of Cambridge, the Isle surveyor. The style is Italian; the walls are of the local bricks, with dressings and arcading in red and black bricks. The hall is 60 ft. long by 30 ft. wide in the interior, and is covered with an open-timbered roof. Arrangements are made for the erection of a gallery opposite the platform, when needed. There are retiring and cloak-rooms; and the rooms are all lighted with gas.

ROAD-MAKING.

Sir,—As a Road Surveyor, born and bred in it, my father having been one of M'Adam's pupils, I have again and again noticed the extraordinary ways surveyors, and especially the surveyors in London, have of making and repairing roads. I can account for it in no other way but that commissioners appoint men not really qualified to undertake the duties of their office, and, in fact, whether they be town commissioners or highway boards, the appointment is gained, for the most part, by local influence, and not by the personal qualifications of the candidate. There seems to be however, generally speaking, better management not only in the election of surveyors, but in every other matter, by turnpike trustees, whose offices are now being so rapidly abolished, they being better educated, and filling superior positions in life.

I think it is wrong to place a thick metalling on roads, for these reasons:—It is far more expensive than a thin coat, as more stone is required. People are too fond of applying the epithet "good" to a thick coat of stones. A thick coat will take longer to settle than a thin; each separate stone forming "the coat," requires a matrix before it can settle; if therefore stones are spread thickly, they have no matrix whatever, and before they can settle, they must wait until a large portion of the coat is pulverised, which pulverised matter then acts as the matrix for the stone. A thin coat, on the contrary, being spread on the soft road, at once finds its matrix by the mud of the road, or by the pliability of the road itself; the individual stones in a thick coat will by attrition rub themselves nearly round,—at any rate, lose all the sharp angles caused by the fracture, thus adding to the length of time the coat will take to settle, as a sharp angular stone will find a bed for itself quicker than a round or rounded stone. A thick coat will not wear in evenly; it will wear "pitty" or "bunchy," because it cannot be kept raked properly: it is more expensive to keep raked, for the longer it takes to settle, the more attention it requires. Then a thick coat does not last as long as a thin coat; for in a thin coat each individual stone sinks at once into its matrix, and one of its faces only is exposed to friction of traffic, while in a thick coat much is wasted in attrition, rubbed into gravel, and then mud, in its attempts to settle; and then, after all, it does not settle so "sweetly" as a thin coat. The sooner a coat of stone is settled, the longer it will last, and of course the less expensive will it be: for that reason alone, a thin coat is preferable.

Another objection to thick coats is, that laying periodically an embankment on roads of 6 in. of metalling soon makes the road higher than the *trottoirs*.

I consider that a coat of stones is of sufficient thickness if one stone touches the other with an extra scatter in the centre of the road to bring it up to the proper convex form.

Regarding the letter to you signed "B. Baylis," I challenge the writer to point to a single spot, either on "town roads" or "suburban roads," in which 6 in. of metalling are required. It is downright cruelty to put on such a coat, whether in once or twice, — cruelty to the ratepayers, cruelty to the owners of carriages and horses, and cruelty to the poor horses themselves.

Mr. Baylis advises the coat to be covered "with a good [!] coat of binding material, clean gravel, or screenings of metalling;" that implies the metalling he uses is screened. What is the use, where is the advantage, of screening the metalling, and then putting the screenings back again amongst the stones when they are spread?

He has "grave doubts" as to whether macadamized roads are indispensable: I entreat him to get up by the side of the driver of the first 'bus he sees, and ask him which he likes best to drive over,—a steined road, or a paved road; and which his horses like best. Nay! I entreat him to watch for himself, and he will see horses on a paved road stepping with short, timid steps, slipping about (falling down perhaps), and profusely sweating; and on a metalled road he will see the same horses stepping out fearlessly, tossing their heads, masters of their work.

The difference in expense, too, is immensely in favour of a metalled road. I say nothing as regards the difference of comfort to the inhabitants of the street in less noise.

Raking the coat is very important, only skilful men should be employed; for if a coat of stones be not kept with as level a surface as possible, how is it possible to have a level face when it has settled? But before the coat of stone is put on, there is first a considerable outlay generally incurred by "lifting;" why I cannot see. M'Adam introduced "lifting" because, before he began with the roads it was the practice to repair a road with stones broken as big as a man's two fists, and not to pay any further attention to the coat after it was on. "Well," M'Adam said, "there is such an immense depth of stones, that I can repair these roads and 'make them' smooth and well-shaped simply by lifting' them, breaking the 'lifted' matter so that it shall go through a 2½ in. ring, and then re-coating the road with it, taking care to keep it raked well." And he did what he said he could do; on the strength of that, and because the roads under M'Adam's care got so much improved, surveyors went on lifting, lifting, lifting,—they are lifting now,—and, upon my soul! I believe they will go on lifting when you and I, sir, are not. What their reason is for this expensive process I have again and again asked, but I have obtained no other answer than "Oh! it is all very fine for you not to do it, but it has always been done here, and I shouldn't fancy a coat without." My father stopped lifting after his roads got into shape. He never lifts now (unless, of course, the road is out of form); and I never lift, except when it is to form a road made by surveyors who thought big stones, and plenty of them, necessary to make good roads. If the road is left until the winter comes in, frost, rain, and snow will lift it without costing a penny-piece, and far more effectually than any artificial means can do it. By lifting a road, a thicker stratum of stones requiring to be settled is added to the coat; the old coat, already weakened by friction, attrition, by the natural effects of its porosity, and all the rest of it, is ground to mud, or ground so small that it is comparatively of no use to the road, so the road is positively weakened by "lifting."

As to breaking, which I ought to have written of first to be in the natural sequence of things; in no case, unless of the most extraordinary character, are large broken stones admissible for road repairing. A coat of stones ought to be broken so that each separate stone can be passed through a 2-in. ring. In breaking the stones smaller, there is too large a proportion of gravel (stones broken to gravel) in the heap; breaking them larger is a waste of material; for a cubic yard of stone broken 2-in. ring size will cover more space than a cubic yard broken 4-in. ring size, a coat of large broken stone (I mean stone broken larger than 2-in. ring size) will not settle as soon as a coat of properly-broken stone. Each stone requires a larger matrix for itself. It has, therefore, to displace a greater portion of the road's surface, and yet it has but the same force exerted on it to drive it into its place as a 2-in. stone; and as I have already implied, the longer a stone is "up" the more unfit does it become for its place, its angles will wear off, and with that its power of becoming really settled in its place. And too, a greater extent of wearing surface is presented: so unless the stone settles well it will "tip" with passing carriages, wear a too large hole for itself, and then there are mud, holes, loose stones, and all the other unpleasantnesses of a bad road. There is not either such a chance for the road settling, or "running" smoothly, as in the case of a coat of well-broken stone. It is impossible to find a quarry in which the stones are all precisely alike in the quality of durability. Then it is still more important that the stones should be broken small, for in a coat of stone in which each stone is subject to the same wearing influences, if one stone is softer than the other, the softer stone will wear first. Thus the surface of the road in this way becomes "pitty" or nodulous. And, too, in a coat of large stones, there must need be larger interstices than in a coat of small stones. In this therefore, the coat of large stones is inferior.

Another needless expense, is sifting the broken stone. I should like to ascertain why surveyors insist upon having the broken stones supplied on their roads sifted. If a road is in good order, it has but little dirt on it, even when it requires stoning: what then can more rapidly and more naturally be the means of uniting a coat of stones than the gravel found in a heap of broken stones, as the breaker leaves the heap? The gravel in the heap acts as a sort of concrete for uniting the stones. Brush a road after wet weather that has been made of large sifted stones, and you will find you can push the blade of your knife into the interstices. Mr. Hickes, the well-known surveyor of Truro, in Cornwall, not only puts on the stones he uses unsifted, but in addition, when the coat is partially settled, he scatters small-broken grey granite over it, the granite being easily broken by a passing wheel, crushes into gravel, and acts as an additional means of getting the coat rapidly settled; and, what is very valuable, he finds that a coat so metalled will not "break up" in the summer. PRO.

SIR,—In answer to "Z. Y. Z.," upon road-making or repairing, I partially agree with Telford's system. There can be no possible doubt that the laying on of equal-sized stones, free from extraneous matter, is correct, as whatever is of a softer material naturally works up to the surface. My experience is, never allow your road to be so far neglected as to form ruts, but the loose stones carefully drawn to the crown of road, and this done *by an experienced man*, if you want a smooth surface instead of a patchy one. I also find placing layer upon layer does not answer, for the simple reason, if you allow the surface of road to be worn partially smooth before laying the required extra coat or covering, the stones are not thoroughly bound together. My practice is, never allow your road to get into that state of neglect as to require 4 in. or 5 in. to be laid on at one time, as a stitch in time, &c.; but lay them on at the proper road-repairing time, keeping the centre well up, so that the road may drain itself dry, the channels open, and the water got rid of as quickly as possible. If these simple matters were attended to, a great saving of labour and materials would be the result.

JOHN MCILQUHAM,
Surveyor to Penrith Board of Health.

HAVING devoted much attention to the subject of making and repairing roads, I consider the system introduced by M'Adam very much superior to that practised by Telford, both as regards durability and economy in their construction and maintenance.

In making roads according to M'Adam's system, no pitching or rough set pavement for a foundation is necessary, as an average depth of from 9 in. to 10 in. of broken stones is sufficient for any road. All the stones should be broken sufficiently small to pass through a ring 2 in. in diameter.

In my practice I have the formation properly drained and well rolled before laying on the material, which consists of broken stones 10 in. deep in the middle and 8 in. deep at the sides, the surface of the road being segmental in form, with an inclination of half an inch to a foot from the crown of the road to the side channels. The broken stones are laid on in three separate coats, each coat being well raked, watered, and rolled until it has become consolidated.

On roads where there is but little traffic, a sprinkling of finely-sifted road-scrapings may be used to facilitate the setting of the stones; but this can be better effected by constant watering and rolling for a short period.

It is a matter of great importance for the stability of the road that it should be impermeable. This is difficult to accomplish when stones of irregular sizes are used, and can only be secured when the broken stones are as nearly as possible of one size, forming a compact and solid mass.

I do not agree with the practice of using gravel "binding" as mentioned in Mr. Baylis's letter in the *Builder*, as I find the smaller stones have a tendency to work downwards, and in so doing displace the larger stones.

I consider the subject of the efficient maintenance and economising materials in the making and repairing of roads is one deserving of more careful consideration than is generally given to it. A. MORGAN, C.E.

LIGHT RAILWAYS.

MANCHESTER INSTITUTION OF ENGINEERS.

AT the first meeting for the Session of the Manchester Institution of Engineers, the president, Mr. W. W. Hulse, read an address "On Light Railways," in which he considered what would be the best system for suburban traffic. This he concluded would be a 3½ ft. gauge line, unless where intended to interchange with the usual 4 ft. 8½ in. or the 7 ft. The 3½ ft., he urged, could be constructed and equipped for less than two-thirds the cost, and be maintained and worked at a corresponding reduction of expense, by comparison with the 4 ft. 8½ in. system. The 3½ ft. system is already largely adopted in Queensland, Ceylon, Norway, Belgium, and other places, and with complete success.

In designing the carriages for the local line, the 3½-ft. gauge is found to give ample accommodation. The carriage which promises to be most suitable is what may be termed of the omnibus type, with seats arranged on each side, and a longitudinal passage, say 30 in. to 36 in. wide, down the middle, with doors opening inward at the ends. The leading dimensions are 20 ft. long, 6 ft. wide, and 6½ ft. high inside. Carriages of this size would accommodate twenty-four passengers, twelve on a side, and give over 30 cubic feet of space to each. The floors of the carriages would be on a level with the platforms, and this, with the wide passage, would give the requisite facility of ingress and egress, which is one of the essentials of a local traffic, where there is a great frequency of trains. In speaking of light railways it is not intended to convey the idea that the works or rolling stock for such a system would be in any respect less substantial and durable than on the heavy 4 ft. 8½ in. system, but rather that the works, engines, and carriages would be, though lighter, sufficiently strong and durable in proportion to the reduced loads and speed of the trains, and that a closer approximation of the paying to the non-paying load would be effected.

ARCHITECTURAL EDUCATION.

ALTHOUGH I have read with great interest the various letters from "Adelphi" and others, which have appeared on the above subject in your journal, I have hitherto refrained from entering into the correspondence, in the hope that the Architectural Association would take up the subject on a more extensive scale than could be done by individual members writing to your journal. These hopes are now about to be realized, and the report of the delegates of the Architectural Association to the Architectural Alliance, which will be submitted on Friday, the 27th of this month, at the meeting of the first-named society, will contain much of the information which "Adelphi" has been in search of, and will also suggest a scheme of education for young architects, which I hope will be taken up seriously, and brought to some definite issue. I take the opportunity of calling the attention of all those who are

interested in the matter to this meeting of the 27th, in the hope that they will attend and bring forward their quotas of suggestions and information. B. PHENÉ SPIERS.

P.S.—I would further add, that in future, at the ordinary meetings of the Association, frames will be hung up containing prospectuses of the various colleges and schools where lectures are given or instruction afforded of direct use to the architectural student, and also the particulars of all the honorary prizes offered by the Academy, Institute, and Association.

DANGER IN THE CEILING.

ALLOW me to call attention to a matter which I consider to be of great importance, inasmuch as it affects not only the comfort and convenience but the safety of ourselves and families.

Within a short space of time, nine instances of the plaster of the ceiling falling from the laths have come under my notice, two of which occurred in the house in which I reside. In one instance the plaster which fell was about 2 in. in thickness, and the quantity more than 1 cwt., the ceiling being very lofty. Nobody at the time was in the room, but it is needless to say that it might have resulted in a fatal accident. As the falling in of ceilings may be occasioned by a variety of circumstances not necessarily consequent upon their being badly put up or on indifferent materials being used, I think the following or some such method might be adopted to prevent the possibility of their falling (at any rate, in very large pieces). If eyes were fixed in the wall on all sides, and strong copper wire taken across the ceiling embedded in the plaster, and here and there fastened to the joists above by staples, there would be little chance of a ceiling (unless very rotten or shaken by an earthquake) coming to the ground. F. T. ARNOLD.

SEFTON HIGHWAY DISTRICT.—WANTED, A SURVEYOR!

SIR,—I was very much gratified by the perusal of your account of the proposed doings of the Institution of Surveyors, and trust that the society will have for its main object the raising of the standard of the orthodox surveyor. This gratification, I regret to add, was sensibly disturbed on turning to an advertisement in the same issue from the Board of the Sefton Highway District, setting forth their wants of a surveyor. Knowing as I do some of the gentlemen forming the provisional committee of the Surveyors' Institution, I can well imagine they, with myself, must feel ashamed at the estimate surveyors are held in by the above board.

Only to find sureties for 300*l.*; and to devote the whole of his time to the supervision of seventy miles of highway, for the munificent sum of 100 guineas per annum!

Surely, sir, it would be but charitable to conclude that the clerk in mistake has transposed these amounts; that the 300*l.* should take the place of the 100 guineas, the latter sum being the surety required; otherwise my knowledge of the profession over twenty-five years assures me that the legitimate surveyor will not aspire to the honourable acquaintance of Sefton Highway District Board; their choice must necessarily rest with some whose fitness to discharge the duties of the office satisfactorily will be on a par with the competency thus publicly proclaimed by this board to reasonably appreciate the services of a duly qualified surveyor by their illiberal offer.

The calibre of this board would appear to be no better than the great Telford described to the legislature the condition and components of highway boards generally years ago. No wonder, then, at the wretched attempts at road-making and repairing so recently alluded to in your publication, when the ability to execute such works properly is held at so unreasonably low a figure as by the worthies of the Sefton Highway District Board.

REDUCED LEVEL.

PRACTICAL AID.

SIR,—I thank you for noticing my endeavours to give instruction to workers in the building trades; but allow me to say I do not claim the professional title of an "architect." I am a builder, and thought I was able to give a little instruction to young men—journeymen and apprentices, in many things that would be useful to them, and create a desire to study for themselves.

I have begun with a greater number (20) than I had first fixed my limit at, and have had to refuse recent applications for want of room. I am pleased with my beginning, and will let you know in two or three months' time how we go on. JOHN D. BOTWRIGHT.*

* The following is the hand-bill:—"Technical Education. Mr. John D. Botwright, builder, Bungay, is desirous of giving free instruction during the winter months, every Wednesday evening, from seven to nine o'clock, at his house, to a limited number of youths and young men—journeymen, apprentices, and workers in the building trades, viz., bricklayers, carpenters and joiners, and stonemasons. The instruction will consist of the study and illustration of some of the elements of practical geometry, useful to artisans in the above trades; preparing and explaining detail and working drawings; the principles of construction, &c., &c."

GALVANIZED IRON CISTERNS AND PIPES.

SIR,—I am building a house in a provincial town, and have specified galvanized iron cisterns and pipes to be used throughout for the water service. However, the secretary of the local water company has been at the building, and said that he should recommend and prefer lead pipes being used, as their water was so very soft. The company obtain their water from the river which runs through the town, and which may receive the sewage of two small villages some distance higher up, and might therefore have a slight taint of sewage.

I have a horror of lead pipes and cisterns, and believe that galvanized iron is the most wholesome and durable material that can be used. I should be much obliged if some of your correspondents would state their experience as to the employment of galvanized iron, and whether soft water, or water with a slight taint of sewage, can have any prejudicial effect upon it.

A NATIVE OF ESSEX.

MAGNESIUM LIGHT.

SIR,—There is no difficulty in lighting a public building with magnesium if expense is no consideration. Mr. Henry Larkin, of 6, Torriano-cottages, Kentish-town, N.W., lighted up a large pavilion for two nights at the meeting of the British Association at Nottingham, in 1866, and the yard of the Guildhall, London, on the evening of Lord Mayor's Day the same year; and Mr. Larkin would be ready to do the same again if required. There is now a fair prospect of a reduction in the price of magnesium through some recent improvements in its manufacture, and it is probable that in the course of next year we shall see the metal retailed at or under 1s. per ounce.

W. W. B.

FORM OF FLUES.

SIR,—I shall be much obliged if any of your correspondents will give me some information about circular or oval flues or chimneys. I see them recommended in various books on buildings, but can meet with no one who has any practical knowledge as to their advantages or otherwise. I am building a house in London, and shall be very glad of any early information on the subject.

STAT VERITAS.

CASES UNDER METROPOLITAN BUILDING ACT.

AT the Clerkenwell Police Court, before Mr. Ellison, Mr. William Thomas Purkiss, of Belle-Vue-villas, Seven-Sisters-road, was summoned by Mr. John Turner, the district surveyor of the eastern division of Islington, for having erected a building at the rear of No. 40, Grafton-road, after the same house had been built, with walls only 4½ in. thick, the door-frame flush with the face of the brickwork, and the roof covered with boarding, contrary to the rules of the Metropolitan Building Act. Mr. Purkiss not being in attendance at the time mentioned in the summons, the magistrate, after deferring the hearing until the other summonses were disposed of, then considered the case, when Mr. Turner stated the building was erected at the end of the main building of the house, between it and the dust-bin; that it was about 6 ft. in length and 4 ft. wide, and about 4 ft. 6 in. high; and that there were eleven other buildings exactly of the same construction added at the rear of the other houses erected by Mr. Purkiss in the Grafton-road. The service of the notice to amend having been proved, the magistrate said the question with him was whether this was a building within the meaning of the Act, when, upon his referring to the statute, he decided it to be so, and ordered that the building be amended as required by the district surveyor, or removed within the period of one month, and that 12s. 6d. costs be paid.

A second summons for a similar building at the rear of No. 2, Gloucester-road was then gone into, when Mr. Turner explained that the building in this case was larger than the former; and there were eight others similar in construction at the rear of the houses erected by Mr. Purkiss in the Gloucester-road. The magistrate made a similar order and award of costs as in the preceding case.

THE FALL OF A WAREHOUSE IN LIVERPOOL.

THE inquest on the bodies of the four men who were unfortunately killed by the fall of a warehouse in Rigby-street has been closed. In the course of the inquiry Mr. Newlands, the borough engineer and surveyor, was examined. He said the premises in question were built before he was appointed borough surveyor. The Act of 1842 would be the only authority under which the then building surveyor would be called upon to interfere in the construction of these premises. Since the accident he had carefully surveyed the building, and found it in conformity with schedule B of the Act referred to. He submitted a report upon the construction of the building, its present condition, and the probable cause of the accident. In reply to the Coroner, he said: The condition of the girder was such as to lead him to the opinion that it had been injured before the accident. The fibre of the beam had been injured by a cross cutting and a screw bolt. There was a natural defect in the beam, but an ordinary examination of it before it was used would not have indicated its actual internal condition as now seen. The ordinary warehouse beams were generally of much greater strength than this, and of somewhat less bearing. They were generally 14 in. by 14 in. Wooden girders,—or, indeed, girders of any kind—if constantly overweighted, would gradually deteriorate, so as to become unsafe. He considered that practical good would come out of this investigation, if, as he had no doubt he would, the coronor called attention to the fact that the limit of safety on the floor in question would have been a 3-ft. load. He would suggest that those places which, like this one, were not built originally for the express purpose of warehouses should be inspected by professional architects, so as to ascertain whether they were in the limits of safety.

The jury gave the following verdict:—

"That the deceased were accidentally killed, owing to the floors Nos. 3, 4, and 5, falling in upon them whilst at work on No. 2 floor, such floors falling in consequence of a wooden girder in the fifth floor being latently faulty and defective, and so giving way under the weight of linseed stored upon it."

Accompanying the verdict was the following presentment:—

"The jury beg to express their entire concurrence in the suggestion made by Mr. Newlands, that warehouses, which have not been originally constructed as such, should, as a matter of safety, be inspected by a competent person; and they entirely acquit the Messrs. Wallace of all blame."

PILES IN A PEAT-BED AT TROWSE.

AT the last monthly meeting of the Norwich Geological Society the principal subject of the evening was a paper read by Mr. J. E. Taylor, honorary secretary of the society, "On the Occurrence of Piles in a Peat Bed at Trowse." Some oaken piles, one of which was exhibited, have been found during excavations at Trowse for sewage purposes. Mr. Morant, the Board of Health surveyor, had written to Mr. Taylor concerning them, and both these gentlemen had investigated the subject. In their opinion there was no doubt that here were indisputable evidences of ancient "lake dwellings," or "crannoges." The excavation in question was a large deep trench, 5 ft. in diameter and 8 ft. in depth, which had been cut across a meadow at Trowse, in order to lay the pipes for conveying the sewage to Crown Point. In the space of twenty or thirty yards no fewer than thirty piles had been found, all standing erect. Each was rudely cut and pointed, and had been driven into a hard layer of gravel. Resting on this gravel was a bed of peat, 3 ft. or 4 ft. in thickness, which surrounded the piles, and contained great quantities of fresh-water shells similar to those now living in the neighbouring rivers, as well as bones of deer, horse, ox, sheep, hare, &c. The tops of not one of the piles passed vertically above the peat. Overlying both peat and piles was a bed of yellow sand and loamy clay, 4 ft. in thickness, and which was thoroughly *undisturbed*. The antiquity of the piles, therefore, is indicated by the fact that over 3 ft. of peat had accumulated around them, whilst the whole of the overlying sand and clay had been deposited since they were broken off or decomposed to their present level. In about 9 in. of "made" earth or surface soil, too, there were found the small roots of very large ash and willow trees, which were themselves at least 200 years old. Similar evidences of "pile buildings" were discovered in the same county, when the late Mr. Birch drained the West Mere, at Wretham, in 1851, and the Great Mere, in the same locality, in 1856, in depths varying from 8 ft. to 20 ft.

CHURCH-BUILDING NEWS.

Cheltenham.—All Saints' Church has been consecrated. The edifice has been erected from the designs of Mr. J. Middleton, of Cheltenham. It is built of Cleeve Hill stone, with Bath stone dressings. The interior is lined entirely in Bath stone, with bands of blue Forest stone. The style is Early French. The shape is apsidal, and the plan comprises chancel, chancel aisles, nave, north and south transepts, and north and south aisles, with porches to each, and a massive tower at the south-west angle. The length of the chancel is 45 ft.; the width 25 ft.; the nave is 93 ft. long and 28 ft. wide, with side aisles, that on the north side 70 ft. long and 14 ft. wide; the south aisle is made rather shorter than the other by a portion of the tower projecting into it. The chancel is approached from the nave through a lofty arch. The chancel has a

semicircular apsidal termination, and is lighted by five two-light windows with carved caps, and arranged for four marble shafts to each window. These windows, it is hoped, will soon be filled with stained glass. Two have already been given by Mrs. Dobson, in memory of her late husband, for many years Principal of Cheltenham College. The roof of the chancel will be formed of wood groining, springing from marble shafts. The sanctuary arch will be placed at a point where the circular end commences, and will be supported on each side by two marble shafts. The roof of the chancel, as well as those to the other portions of the building, are intended to be decorated with colour. The reredos is designed to be of great beauty and richness, formed by an arcade of fifteen arches of alabaster marble, the effect of the three behind the altar being further heightened by filling in the space within the arches with glass mosaic. The chancel aisles are separated from the chancel by two arches on each side, supported by granite pillars in the centre, and respond pillars of Devonshire marble. The nave produces an effect from its height, 55 ft. The arches between the nave and aisles are supported on highly-polished red granite shafts, and at the responds, with short marble shafts, resting on corbels. The transept arches are similarly supported. The clearstory windows are large three-light windows. The west end is lighted by a large circular window and two two-light windows under it. The transepts are similarly lighted. The aisles are lighted by two two-light windows; the one at the west end of the north aisle has been completed with its marble shafts and stained glass, the gifts of a lady. This glass is by Hardman, and consists of full-length figures of Edward the Confessor and St. Alban. The roofs are supported by a series of stone arches. The architect has availed himself very largely of the blue stone found in the Forest of Dean. The arches, including those to the windows, are composed of this and Bath stone alternately, while bands of it on the plain walling relieve the whiteness of the Bath stone and make it harmonise with the richer colours of the granite and marble. The roofs are high pitched throughout, and are covered with Broseley tiles. The tower has only been built to the height of 45 ft., but is intended, with its spire, to be more than 200 ft. high. The church will seat nearly 1,000 persons. The works generally have been executed by Mr. Thomas Darby.

Accrington.—The new church of St. John here has been opened by licence for divine service. This church was originally planned to occupy the south-west corner of the plot upon which it now stands, leaving space on the side next the railway for the erection of a school at a future time; but in consequence of another plot being promised for the schools by Mr. Peel, the church was placed in the centre of the plot, and the late Rev. G. Garbett and the committee approving of the arrangement of the plan as then designed, little or no alterations were made. It consists of a nave 92 ft. in length, and 40 ft. wide in one span, the object being to avoid the obstruction of columns as much as possible, and the usual objections to a wide single span roof: a simple arrangement of the roof timbers admits of lightness in appearance, combined with strength. The wood is stained and varnished, and the space between the spars coloured blue. There are two transepts, each 26 ft. wide and 21 ft. deep, separated from the nave by stone arches in a single span, springing from the caps of half circular columns on each side. On the north side of the nave is a porch, and at the south-west corner is a baptistery in the lower part of the tower, and having arched openings into both the nave and side aisle. There is one side-aisle occupying the space between the tower and south transept, 39 ft. 4 in. long by 12 ft. in width, and separated from the nave by an arcade of three equilateral arches. The chancel, which is approached in the centre by two steps from the nave, is 29 ft. long by 19 ft. wide, having on the north side the vestry, and on the south the organ chamber, which is open by arches both to the nave and chancel. The lower portion of the reredos has four buttresses, having the three spaces between filled with moulded stone panels, laid with encaustic tiles, and the upper part is divided into three arched panels (intended by the architect to be filled with marble Mosaic) by green marble short columns, having carved caps and moulded bases, with bands of white marble, the whole supporting a moulded cornice at the level of the window sill, and having the spandrels of panels filled with tiles. The east window has three lights, with cusped opening in the head above, enclosed within an arch, over which, in illuminated letters, on a coloured band, is the text, "Holy, holy, holy, Lord God of Hosts." The window is a memorial one, in stained glass, to the late Rev. G. Garbett, the centre light having, under an ornamental canopy, a figure of Christ, and under similar canopies on one side are figures of the Virgin Mary and St. Peter, and on the other St. John the Evangelist and St. Joseph, with the emblems of each underneath. Externally, the church is of plain and simple detail, nearly all label moulds and other moulded work having been objected to at the commencement of the work, as likely to add unnecessarily to the expense. The general architectural effect of the building was therefore sought to be obtained from the arrangement of the plan, so that the church, approached from Burnley-road or from Dowry-street, should present a well-grouped effect, and give a broken and picturesque outline. The belfry has coupled arches on all sides, filled in with slate louvres, ornamentally cut on the outer edges. Above this the tower has a cornice, surmounted at the angles with pinnacles, taking the form in the lower part of circular stone columns, with caps and bases. From here the spire rises in an octagon form, having plain bands of stone at intervals; this method of breaking up the plain surfaces of walling being adopted throughout the exterior, together with the arches over the windows, &c., being composed of alternate plain and pitch-faced stones. The roof is covered with alternate bands of cut and plain slating, in two colours. The ordinary leaded windows with small panes are superseded in this church, by the architect having introduced zinc frames, forming a network of geometrical tracery, the bars being nearly as light in appearance as lead-lights, but much stronger, and requiring no saddle-bars to interfere with the design, and having the further advantage of being able to be glazed like an ordinary window-frame. The whole are glazed with ⅛-in. plain rolled plate,—translucent, but not transparent. The whole of the internal fittings are of varnished pitched pine, from the architect's designs. The heating is by water circulating in square pipes, which run round and are level with the raised floors of the open benches; the boiler, &c., being placed under the floor of the baptistery, with an approach from the outside. The lighting of the nave and transepts is by brass standards of nine burners each, the chancel by two corona standards and two brackets, and the side aisle and remainder of the interior by wall brackets. The masons' work was executed by Mr. John Riley; the joiners' work by Mr. William Roberts; the slating and tiling by Mr. Richard Holden. Mr. Henry Macanlay, of Accrington, was the architect.

Sheffield.—The foundation-stone of St. Mark's Church has been laid. The architect is Mr. Crossland. The site has been given by Mr. William Butcher, and lies immediately behind the present temporary iron structure.

Bolton. — Holy Trinity Church, Bolton-le-Moors, has been re-opened after an interval of several weeks, during which extensive alterations have been effected. The old pews have been replaced by others, but they do not extend so far eastward as the old ones. In the two eastern bays of the nave is a chancel-like arrangement. The floor is raised three steps, and laid with Maw's ornamental tiles. The chancel-fittings are of pitch pine. No part of the main fabric of the church has been touched. New gas coronæ, with a few brackets and standards, take the place of the old and shabby gasfittings. The church has received some coloured decoration. The ceilings are a soft blue, and in the centre of each of the fourteen nave panels is an ornamental medallion, two devices being placed alternately. The walls are of a cream colour, and the mouldings, cornices, and other parts are slightly touched and relieved with different colours. The baptistery has somewhat more ornament and colour. The fittings were all prepared before the workmen entered the church. Mr. W. Clark, of Manchester, was the joiner employed. The tiling was done by Messrs. T. Dale & Son, and the painting and decoration by Mr. R. Park, of Preston. The architects, from whose designs and under whose superintendence the whole work has been executed, are Messrs. J. Medland Taylor & Henry Taylor, of Manchester.

Ruyton.—Mr. J. Walford, J.P., of Treago Castle, Ross (and the largest landowner in Ruyton), gave the money for executing the work in a *new font* for the church; and the architect, Mr. H. Percival, gave the design and the working drawings, and saw it erected. The font was executed by Mr. Bonehill, of Manchester, carver, &c.; it is done in Bath stone and marble shafts, on York stone base.

Bicester.—Ambrosden Church, which has been undergoing a repair, has been re-opened. The restoration has been superintended by Mr. C. N. Beazley, of London, and the work has been executed by Mr. Lewis, of Bicester. The cost of the restoration is 1,400*l.*

DISSENTING CHURCH-BUILDING NEWS.

Market Weighton.—A Wesleyan new chapel has been opened here. It occupies a site near to the old chapel, having a frontage to the principal street. The building is designed in the Italian style by Mr. Wm. Botterill, of Hull, architect, and externally it is executed in white stock bricks, with dressings of stone from the Harehill quarries. The principal elevation exhibits three compartments (in which are placed the doorway and window openings), divided by pilasters with moulded bases and carved capitals. The central arch connecting the pilasters rises into the gable, which is finished with a modillion cornice and ornamental apex. The side elevations are also divided by pilasters and arches, with two tiers of windows, the one below and the other above the galleries. There is a low flight of steps to the entrances in front of the chapel, with vestibules to communicate with the aisles on the ground-floor, and staircases to the galleries, which are on three sides of the building. Internally, the dimensions are,—length 54 ft., width 34 ft., and height from the floor to the ceiling 30 ft. At the further extremity of the chapel is a back entrance, with ministers' vestry, and staircase communicating with an organ chamber or recess above the same. The pews and other internal fittings generally are of red deal slightly stained and varnished. The ceiling of the chapel is divided into moulded panels, with ornaments in the centre, and surrounded with a denticular cornice. The lighting is by gas pendants from the ceiling, and the warming by hot-water apparatus. The accommodation provided is for nearly 400 persons, and the cost will be about 1,600*l.* The bricklayers', masons', and plasterers' work has been executed by Mr. R. Pape, of Beverley; the carpenters' and joiners' work by Mr. James Jackson, of Hull; the plumbing and glazing by Mr. H. H. Law; and the painting and varnishing by Mr. James Richardson, both of Market Weighton; the slaters' work by Messrs. T. Smith & Co.; the gasfitting by Messrs. Stones, Settle, & Wilkinson, of Hull; and the heating apparatus by Messrs. A. M. Perkins & Son, of London.

St. Dominic (Cornwall).—The opening of a new Wesleyan chapel at St. Dominic, took place on the 22nd ult. The building is a simple Gothic structure, suited to the locality in which it is placed. The materials used in its construction are local stone, with granite quoins and Polyphant stone for columns of main entrance, &c. The chapel will accommodate about 200 persons, and has been erected at a cost of 500*l.* A schoolroom and other buildings will be eventually added. Particular attention has been paid to the ventilation of the chapel. The contractors for the work were, Messrs. Cousens (carpenters) and Pood (mason), of St. Dominic; and Mr. Henry Pearse, of Stonehouse, was the architect.

Ollerton.—We understand the deposit money has been paid for ground for a new Primitive Methodist Chapel at Ollerton. The site is in a desirable situation, being in the principal street in the town, and consists of the butcher's shop formerly in the occupation of the late Mr. Henry Turner, and the house adjacent. The building will be about twelve yards long by eight yards wide, and is to be built close alongside of the cottage occupied by Miss Elizabeth Ward: the work to commence in the spring. It is intended, when the edifice is completed, to have a resident minister at Ollerton, for whom, if possible, a house will be provided near the chapel. The chapel about to be built will make the fifth erected in twenty years.

Godalming.—The new Congregational church has been opened for divine service. There was a difficulty in regard to the foundation of the building; 2 ft. below the surface the contractors came upon a quicksand, and were obliged to concrete the bottom to keep out the damp. This

operation had entailed an expense of 80*l.* or 90*l.* beyond what was anticipated. The following details of expenditure have been given:—Purchase of land, 300*l.*; building of chapel, 1,712*l.*; tower, 200*l.*; stained glass, 78*l.* 15*s.*; railings, &c., 104*l.*; organ, 120*l.*; heating apparatus, 45*l.* 10*s.* The total cost was 2,690*l.* 5*s.*; the expense of schools bringing that sum up to 3,660*l.*

SCHOOL-BUILDING NEWS.

Earl's Barton.—The new British school at Earl's Barton has been opened. It has been built by Mr. Renshaw, from plans, and under the direction, of Mr. Sharman, of Wellingborough. The site of the school, with the adjoining yards, consists of 1,200 square yards, and the building has been erected in accordance with the rules of the Committee of Council on Education, by whom the plans and specifications were approved. The building is of a semi-Gothic character, and consists of one large room, an infant school, and a class-room. The school-room is 71 ft. by 18 ft., the room not being in one length, but one part of it at right angles to the other. The school is a mixed one for boys and girls, who are taught in the same room, but there are two distinct play-yards, with swings, &c., and distinct lavatories. The cost of the site was 90*l.*, and the lowest tender was 974*l.*, the whole cost of the building, including the expense of conveyance, of architect's charges, of school fittings, &c., being 1,364*l.* 11*s.* 11*d.*

Slough.—The plan of Mr. Edgington for the boys' school and teacher's house of the proposed National School was returned with the request that a reduction might be effected so as to bring the estimate for both within 1,000*l.* This has been done, and the Messrs. Fassnidge, of Uxbridge, will at once commence the work. Mr. Edgington's plan for the infants' school has been also adopted, and will be carried out by the Messrs. Fassnidge at the same rate of cost as the boys' school. The infants' school will be built adjoining the present school in Herschel-street, the latter being converted into a girls' school. The buildings in question will be made to contain,—boys' school, 140; girls' school, 100; infants' school, 80. The boys' school and teacher's house will stand on the piece of ground which lies at the junction of Hencroft and Osborne streets. The National Society have made a grant of 160*l.* towards the new schools and teachers' houses at Slough and Chalvey, and the Government Council of Education have made a grant of 205*l.* to the building fund for the Chalvey schools and teacher's house.

Elmley Castle.—The foundation-stone of new schools at Elmley Castle has been laid by Lady Pakington, who for many years past has done much to promote education in this village, where she possesses considerable property. Mr. Rowley, of Walsall, architect, furnished plans, which were accepted. The site upon which the building will be erected is an eligible one, at the entrance to the village, and within a few minutes' walk of the church. It is intended that the structure shall be a blending of the domestic Gothic and Tudor in style, and of brick with stone facings, and oak ornamentation. It will consist of school, class-rooms, and mistress's dwelling, on the Government plan, together with garden and play-ground. Lady Pakington has given 500*l.* to rear the edifice, and promises 50*l.* more if required.

Books Received.

Macdonall's History of Dumfries.

THIS is a useful and carefully-written, although somewhat over-voluminous, account of the ancient and royal Border burgh, together with its surrounding relations. There is, however, no doubt of the general attractiveness of the subject. Our readers will, perhaps, remember that we printed some articles on Dumfries and the neighbouring district of Annandale in the *Builder* two or three years ago; and those who are interested in the subject, and care to pursue it, will find some very good material in the present volume. The only quotation we can find room for is one which gives us an account of the Domestic Architecture of Dumfries during the period of King Robert the Bruce:—

"All the houses in town or country, except those occupied by barons, were built of wood or clay, roofed with straw or heather. 'Generally,' says Tytler, 'we connect the ideas of poverty, privation, and discomfort with a mansion constructed of such a material [as timber]; but the idea is a modern error. At this day (1829) the mansion which Bernadotte occupied as his palace when he was crowned at Drontheim,—a building of noble proportions, and containing very splendid apartments,—is wholly built of wood, like all the houses in Norway; and, from the opulence of the Scottish burghers and merchants during the reigns of Alexander III. and David II., there seems good reason to believe that their mansions were not destitute either of the comforts or what were then termed the elegancies of life.' For ages afterwards this perishable material continued to be put to the same use. Streets so formed could easily be destroyed by an enemy: but then they could be restored at a much less expenditure of time and labour than if stone had been employed. The Dumfries of Bruce's day was a town of timber. The freestone quarries of Castledykes and Locharbriggs had been partially drawn upon, but only for building the castle, the bridge, and the few ecclesiastical structures of which the burgh could boast; and stone tenements for any but the middle and upper classes were rare within it till the reign of James III. About that time houses began to be erected with a ground story of stone, and a projecting upper one of wood,—a style which continued long in favour with the burgesses."

We may add that Mr. Macdonall has devoted considerable space to the subject of the old bridge across the Nith,—the pious gift of the devout Devorgilla (the foundress of Baliol College, Oxford), whose biography also constitutes one of the most interesting episodes in the History.

Historical and Architectural Notes on the Parish Churches in and around Peterborough. By the Rev. W. D. SWEETING, M.A. London: Whittaker & Co. 1868.

THIS volume consists of a valuable series of notes and extracts, from registers and other documents, relating to the various churches and parishes in and around Peterborough, and is illustrated with thirty photographs of the buildings. These are rather too small for the practical architect, still with a glass even the details can be made out. But for the doubt that still remains as to the long endurance of ordinary photographs, no equally good mode of illustration could be employed. Several of the churches will, doubtless, become better known through Mr. Sweeting's very useful labours than they have hitherto been.

Architectural Foliage, adapted from Nature. By JOSEPH BARLOW ROBINSON, Sculptor.

A Series of Designs for Carved Panels, suitable for Headstones, &c. By J. B. ROBINSON. London: Bemrose & Sons, Paternoster-row.

THE examples of "Architectural Foliage, adapted from Nature," in six parts, are intended for the enrichment and decoration of buildings, monuments, furniture, and other ornamental works. They include a series of designs for capitals, bosses, crockets, finials, diapers, and corbels, and show a considerable amount of taste and skill.

The designs for Carved Panels are in two parts. The designs are adapted from natural foliage, with scrolls and monograms, and will afford many serviceable hints to cemetery sculptors. Mr. Robinson has also published a cheap book of headstones and crosses, some of them meritorious.

The Feudal Barons of Powys. By MORRIS C. JONES. London: Smith, Soho-square. 1868.

POWYS, or Powis, was the ancient British name of an eastern principality of Wales, of which what is now called Montgomeryshire formed a part. The archæology and history of this district form the chief subjects of interest to the Powys-land club, of which Mr. Morris Jones, of Welshpool, an energetic archæologist, is one of the honorary secretaries, and the Earl of Powis, of Powis Castle, is the president. The members of the club, which is a new one, are limited to 100, and they already number eighty-seven, although the association has only been formed since the end of last year. The sale of the volume under notice is itself limited to 100, and the net proceeds (if any) will be devoted to an "Illustration Fund" which it is wished to establish in connexion with the club. The work contains an account of the Lords of Powis and the abeyant Barony; and in an appendix are the proposal-laws and list of members of the Powys-land club.

VARIORUM.

WE have received No. 3 of "Sloan's Architectural Review and Builders' Journal," published monthly in Philadelphia, U.S. It contains a considerable amount of readable and instructive matter, and a number of very-well executed illustrations.——The *Bombay Builder* for October, includes a view of the "Poona Engineering College," which originated with Mr. Cowasgee Jehangeer Readymoney, who gave 50,000 rupees (justifying his name) towards the erection of the building. A number of small domed turrets and the stone cresting on the parapets, give an Eastern character to the building scarcely agreeing with the roofed tower. The *Bombay Builder* says,—"The design is attributed to Mr. Trubshaw, formerly architect to Government. We say *attributed*, because we have been given to understand that Messrs. Paris & Molecey, who were the assistants to Mr. Trubshaw, are the real designers."

Miscellanea.

BUILDERS' BENEVOLENT INSTITUTION.—The annual dinner of this Institution, which is entitled to the support of our readers, will take place on Thursday, the 26th inst. Mr. G. F. Trollope will preside.

THE ARTISANS' DWELLINGS ACT.—The Poplar District Board of Works have taken action under Mr. Torrens's Act. Two houses in Barr's-alley, Robin Hood-lane, were reported by the medical officer as being unfit for human habitation. The Board passed a resolution ordering the landlord to demolish the houses within a period of three months.

TRADES UNIONS AND ARBITRATION.—A crowded meeting of delegates from most of the metropolitan trade societies was held at the Bell Inn, Old Bailey, on Saturday night, to consider what steps should be taken to forward the adoption of arbitration in trade disputes. It was resolved:

"That this meeting of trade societies' representatives approves of the principle of arbitration, in the belief that it is the best method of settling disputes between employers and the employed; and recommends that trades committees in their various localities seek to bring about meetings of masters and men, with the view of establishing boards of conciliation and arbitration; and this meeting feels deeply indebted to Mr. Mundella for the successful efforts he has made to establish such boards."

HORTICULTURAL BUILDINGS AND APPLIANCES.—The trade-book of Horticultural Buildings, hot-water, and hydraulic appliances, issued by Mr. T. G. Messenger (of Loughborough), will be found useful and suggestive. Mr. Messenger has some special arrangements of his own, of which he gives the following outline:—

"Upon a sill of wood, iron, or stone, as may be preferred, but usually of wood, cast-iron muntins, with bracket-heads to receive rafters, are erected. Upon these muntins rests a light plate to receive sash-bars, and carry gutter. The rafters are of wood of very small scantling, so as to offer the minimum obstruction to the admission of sun-light and heat; but as any one acquainted with the strengths of timber will be well aware, such scantlings, when placed as is usual at distances of 4 ft. or more apart, are themselves inadequate to bear either the stress of snow, workmen climbing upon them for painting, &c., or even of a heavy crop of fruit. In order to obtain the required strength without increasing the scantling of the timber, these rafters are trussed with iron tension rods, which are secured to the iron muntins at foot of rafter, and to an iron saddle at the ridge, giving to these light rafters as much strength as was formerly obtained by the use of rafters 9 in. or 10 in. deep. The iron saddle, besides being available for securing tension rods, effectually connects the rafters and the ridge."

PICTURES FOR SALFORD, LANCASHIRE.—At a recent meeting of the town council of Salford, the ex-mayor read a communication from Mr. Alderman Agnew, containing the following passage:—"In taking leave of my friends I must avail myself of this opportunity of expressing my cordial thanks to them. For many years past I have occupied myself in the collection of pictures, and especially of portraits of eminent Lancashire men, with a view to bequeath them to an institution in which from its establishment I have felt the highest interest. I refer to the Royal Museum and Library in Peel Park. I ask you, my dear Mr. Mayor, to make known my desire to present this collection to the corporation at the present time for the use of the Museum. I enclose a list of the pictures herewith. If upon the occasion of my retirement from public duty the gift of this collection gives increased interest to or promotes the usefulness of the Museum, I shall see no cause of regret in the necessity there exists of my severance from my respected friends in the corporation." A resolution was passed expressing regret at the retirement from the council of Mr. Alderman Agnew, tendering him the best thanks of the council for his valuable gift, and expressing a hope that he may be long spared to witness the growth and extension of those educational and benevolent institutions and objects of which he has during a long life been a warm supporter.

ENGLISH CHURCH NEAR SMYRNA.—On the 4th of November the Bishop of Gibraltar consecrated a new church at Boudjah, near Smyrna. On that occasion there was a repetition of the same fraternal courtesy on the part of the Archbishop of Smyrna as has been exhibited by the Patriarch of Constantinople on another occasion.

METROPOLITAN TRAMWAYS.—Notice has been given of application to Parliament for power to form tramways to run from Archway Tavern, Highgate, and Seven Sisters'-road, along the Holloway-road and High-street, Islington, to the Angel, and thence through the City-road to Finsbury, Whitechapel, &c., and as far as Stratford.

BRITISH MUSEUM.—The unsightly series of glass sheds, built up between the columns in front of this noble building some ten or twelve years ago, is now in course of demolition. It is not easy to say why these sheds were allowed to disfigure the building for so long a period, especially as it was generally understood there was sufficient room in the museum itself for the marbles there stowed away.

MEMORIAL WINDOW, CAMBRIDGE.—It has been resolved to obtain subscriptions in order to fill the east window of St. Michael's Church, Cambridge, with stained glass, as a memorial of the Rev. W. J. Beamont, vicar of St. Michael's. Whatever surplus may remain is to be spent in establishing prizes of books, to be given to promising students at the Cambridge School of Art, to be called the Beamont prizes.

THE "POLLARD DOG."—Mr. F. T. Pollard has recently secured by patent an ingenious form of "Dog," mounted in a slide, and adjusted upwards or downwards by simply turning a hand-wheel under the bench. The hand-wheel is connected to chuck or plate, in the face of which a volute groove is cut, and a pin projecting from the "Dog" into this groove receives vertical movement from the rotation of the volute. The whole apparatus is mounted on a bracket, which is screwed to the underside of the bench. The "Dog" can be raised or lowered from the side, or from the end of the bench, and the whole is constructed so as to move quickly, and be easily adjusted to its work.

THE TOWER SUBWAY COMPANY.—The first ordinary meeting of this company, which is proposes to make a new tunnel under the Thames from Tower-hill to Southwark, for the conveyance of passengers and goods, has been held at the Guildhall Coffee-house. It was stated in the prospectus that it is intended to run a steam omnibus on a steel railway through the tunnel, to be brought to the surface by hydraulic lifts, the time of the journey to be three minutes. The tunnel is expected to be finished in eight months, and the cost is not expected to exceed 16,000*l*. Mr. P. W. Barlow, F.R.S., one of the directors of the company, took the chair. The report having been read, the chairman stated that the prospects of the company were excellent, and that the remuneration of the enterprise would be on a scale not generally imagined. The report was unanimously adopted.

THE VELOCIPEDE MOVEMENT.—The French have taken up this subject in earnest, and if any one could now apply some simple and easily-obtainable motive power to velocipedes he would be certain to profit largely by it. The *Salut Public* of Lyons informs us, that in certain departments, and especially in the Aube, even the rural postman may now be seen riding on three-wheeled velocipedes, behind which is fixed a box for holding small parcels which they undertake to deliver. The men not only perform their service in three hours less time than on foot, but are able in a few months to get back the cost of their vehicle by their earnings from the increased commissions they are able to execute. In this country, too, an interest in the subject seems to be increasing. A velocipede journey lately took place, in which a person, who resides fifteen miles north of Bristol, drove and rode a velocipede, which he built himself, from thence to London, a distance of 135 miles. He left home at four p.m., and reached Reading the same night. Next morning he left for London, arriving at ten a.m., scarcely at all fatigued by his long journey. Residents in suburban and out-of-the-way places near London, who have daily business in town, might have healthful exercise and be independent of railways were they to use velocipedes. The vehicle would soon repay its own cost.

WEST LONDON DISTRICT SCHOOLS.—The second premium has been awarded to the design submitted, in competition, for these proposed schools at Ashford, Middlesex, by Mr. R. H. Burden.

FEVER IN BELFAST.—During the month of October, eighty-seven cases of fever in Belfast were reported to the Sanitary Committee. This is a slight increase, but the health of the town generally is said to be good.

ANOTHER EXPEDITION TO THE NORTH POLE.—Doctor Petermann has received official information from the Geographical Society of New York that the United States intend to send another exploring expedition to the North Pole. England ought not to give up.

COMMERCIAL TRAVELLERS' SCHOOLS.—Two new wings, at a cost of about 6,000*l*., have been added to the Commercial Travellers' Schools at Pinner. At a luncheon, which subsequently took place in the dining-hall of the institution, it was announced that the day's subscriptions, with 1,200*l*. previously received, amounted to 5,000*l*.

DEATH OF MR. WM. THOMAS.—We hear with regret of the sudden death of Mr. Wm. Thomas (successor to the late Mr. C. H. Smith). Mr. Thomas was well known for his practical experience in all matters connected with stone. He was intrusted by her Majesty with the superintendence of the Prince Consort's Mausoleum at Windsor, now in course of completion under Mr. A. J. Humbert. The consideration of the Queen was marked by the attendance at the funeral of one of her Majesty's private secretaries.

WEST SURREY WATER-SUPPLY.—Notice has been given of an intention to apply to Parliament for the incorporation of a company for supplying with water the towns of Walton, Weybridge, Chertsey, Byfleet, Cobham, and Shepperton, in Surrey; Walton and Shepperton, in Middlesex; and the districts and places adjacent to these towns, and for other purposes. The water is to be taken from the Thames and from various springs and brooks, and led into reservoirs, whence it is to be taken by conduits or lines of pipes to the respective places to be supplied.

IMPROVED GOVERNMENT FOR THE METROPOLIS. With the view of early action in the new Parliament, on the now most urgent question of the government of the metropolis, the Metropolitan Municipal Association have given the requisite Parliamentary notices for their bills to establish municipalities and a corporation for London, with the intention of proceeding, at the earliest opportunity the forms of Parliament will permit, in their discussion. It is anticipated other schemes will be proposed, and that the Corporation of London will have taken preliminary evidence by the committee of the Corporation appointed by the Court of Common Council, with a view to a definite policy on their part, and in view of the imminence of some decided action on this all-important question.

OPENING OF A CORNISH BARROW.—A barrow on Tredinney-hill, six miles west of Penzance, has been opened. The barrow is nearly a complete circle, with a diameter of 38 ft., enclosed by an outer circle of large granite slabs set on edge. A trench having been sunk in the middle of the mound, to a depth of about 18 in., the explorers came to a large pile of granite rocks, heaped together promiscuously. The course of one of these, which sloped in an easterly direction, at a distance of 7 ft., was followed, and led to a flat stone, 3 ft. by 2 ft. On raising this stone the rim of an urn was seen, filled with fine dark earth, and further exploration proved that this was one of the ancient Celtic kists, and one which has turned out to be unique in the district. Instead of being formed in the usual way, of four stones set on edge, it was constructed of two stones to each wall, the upper one slightly overlapping the other in such a manner that the urn, which was placed mouth downwards, was tightly wedged in. The only other kist of this description ever discovered in Cornwall was at Gwithian, in 1741. The urn is ornamented round the upper part by three bands of rude irregular indentations, which extend over four knobs or handles protruding from the sides. The style of pottery is rude, and the vessel is not well baked. It was filled with human bones, very much less burnt than those found on previous occasions, and identified as those of a woman.

FIRST STONE LAYING.—On the occasion of laying the first stone of a residence in the Finchley-road, the owner, Mr. A. J. Woodhouse gave a dinner last week to the *employés*, sixty or seventy in number, of Messrs. Mather & Read, by whom the house is to be built, Mr. Mather presiding. In the course of the evening attention was called to the gradual prevalence of a better feeling between employers and employed than did exist, and to the growing conviction that a mutually conciliatory policy was the best adapted to the interests of both.

TENDERS.

For building chapel-of-ease, Hollybush Castle, Morton, Worcestershire (portion of materials given). Mr. Fredk. Preedy, architect:—

Hughes	£723 0 0
Wall & Hook	640 0 0
Garbutt	632 10 0
Inwood	597 0 0
Griffiths	595 0 0
Smart	583 10 0

For rebuilding north aisle and restoring part of Yelling Church, Huntingdon. Mr. Fredk. Preedy, architect:—

Thackray (accepted)	£519 0 0

For putting new roofs and attics to Stubbings House, Maidenhead, for Mr. H. D. Skrine. Mr. Fredk. Preedy, architect:—

Silver (accepted)	£1,060 0 0

For pipe-drainage at Greenford, for the Board of Guardians of the Brentford Union. Mr. J. Figg, surveyor:—

Floy	£135 0 0
Bell	129 0 0
Battey	119 0 0
Brunsden (accepted)	115 0 0

For brick-drain, &c., at Hounslow, for the Board of Guardians of the Brentford Union. Mr. J. Figg, surveyor:—

Hirons & Porter	£250 0 0
Nias	150 0 0
Burchett	115 0 0
Brunsden (accepted)	113 0 0

For building a dwelling-house on the British Estate, Hornsey, for Mr. W. Chapman. Mr. C. W. Horne, architect. Quantities not supplied:—

Wilkinson & Garet	£465 0 0
Tull	395 0 0
Taylor	365 10 0

For the erection of a public-house, stabling, &c., Actonlane, Acton, W., for Mr. Wm. Williams. Mr. Edward Monson, jun., architect. Quantities supplied by Mr. D. W. Young:—

Harding	£1,565 0 0
Messrs. Chamberlain	1,339 0 0
Adamson & Sons	1,328 0 0
Wright (accepted)	1,200 0 0
Welch	1,195 0 0

For model dwellings, Grosvenor-mews, Bond-street, for the St. George's Parochial Association. Mr. R. H. Burden, architect. Quantities supplied:—

Morris	2,945 0 0
Patman & Fotheringham	2,875 0 0
Fish	2,690 0 0
Gammon & Son	2,685 0 0
Longmire & Burge	2,643 0 0
Stoner (accepted)	2,615 0 0
Keyes & Head, too late.	

For alterations and additions to the parish church of Ruabon, North Wales. Mr. B. Ferrey, architect. Quantities supplied:—

	General Works.	Porches.
Black & Readie	£3,800 0 0	£249 0 0
Higham	3,150 0 0	214 0 0
Yates	2,891 0 0	235 0 0
Dove, Bros.	2,795 0 0	205 0 0
Chester	2,593 0 0	215 0 0
Potter	2,430 0 0	165 0 0
Williams	2,218 0 0	180 0 0

For new baths, Cowes, Isle of Wight. Mr. James Woodman, architect. Quantities supplied:—

Chinnock	£4,965 0 0
Nightingale	4,567 0 0
Wheeler	4,480 0 0
Stephens	4,100 0 0
Thomas	3,903 0 0

For alterations and additions to No. 15, Hereford-road, Bayswater. Mr. Wilson, architect:—

Blease (accepted)	£248 0 0

TO CORRESPONDENTS.

Engineer Competitors for India.—A rejected candidate requests us to insert copy of a letter addressed by him to the Secretary of State for India. Were we to do so it would simply serve to justify the rejection.

Fair'ord Windows.—Next week.

F. T. A.—J. P. St. A.—W. B. S.—H. L.—W. W.—J. G.—H. B.—Amateur.—M. P.—T. H. W.—Cron. M. S A.—A. S.—W. H. L.—C.—J. F.—A. P. W.—A. B.—W. G. S.—E. M.—F. S.—R. H. B.—J. P.—W. F. N.—J. T.—W. T. P.—H. K. B.—J. S. (what is the object of the company, and how has the profit been made ?)—Q. E. D. (ought certainly to be allowed to complete his work by adding the gates; but, of course, has no power to control his employer's will).—M. E. K. (usually excavated first).—W. M. jun. (letter is an advertisement).—J. G. W. (next week).

Country newspapers should be marked.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.